

Laparoscopic versus abdominal hysterectomy in the treatment of endometrial cancer

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ABSTRACT

كانت عملية فتح البطن لاستئصال الرحم الطريقة الوحيدة لعلاج سرطان بطانة الرحم وذلك حتى بداية العقد الأخير من القرن العشرين عندما تطورت الوسائل الجراحية لاستئصال الرحم والمبيضين والغدد اللمفاوية بواسطة المنظار، فاحتلت جراحة المنظار مساحة مقدرّة بوسائل العلاج الشفائية لتفوقها أحيانا بمميزات مقدرّة عن الطريقة التقليدية، فعدت طريقة مفضلة بأولوية كوسيلة من الوسائل الجراحية. هناك حضور مضطرب للتطبيق السريري للجراحة بالمنظار ويحتاج لإثبات الفائدة نتيجة هذه التقنيات الحديثة بدرجة تستحق التعميم واقتصار الطريقة التقليدية على حالات محددة. الدراسات الحديثة تعزز فعالية تقنية جراحة المنظار خصوصا بجراحة الأورام النسائية لنمو الخبرة وتبادلها بين الجراحين. عملية استئصال الرحم وتحديدا بحالات الأورام تبقى الرواية وبؤرة الاهتمام، فتأتي هذه المشاركة البحثية باستعراض وتحليل الأدبيات المتوفرة والمنشورة بالمجلات الطبية حول هذه التقنية ومقارنة نتائجها وتقييم دقيق للمؤشرات، والقيود، وكذلك فوائد ومخاطر هذا النهج لاستئصال الرحم. يجب إيلاء الاعتبار الواجب لمنح المريضة فرصة إجراء عملية استئصال الرحم بطريقة المنظار لتتمتع بالفوائد التي قد تقدمها.

Up until 20 years ago, laparotomy was the single method of surgical treatment for endometrial cancer. Wider acceptance for the laparoscopic approach has been gained by gynecologic surgeons as an alternative surgical method. Clinical application of laparoscopic surgery has grown rapidly, yet it remains to be proven if this technique has brought great benefits. The location of minimal-access surgery in gynecologic oncology has proven effective particularly with the growth of exchanged experience among surgeons. As operative laparoscopy in gynecologic oncology remains novel, the potentiality of the procedure is underscored. In this review, we survey the literature on this technique and critically evaluate the indications, limitations, as well as the benefits and risks of this approach to hysterectomy. Due regard should be given certain patients with indications

for an abdominal hysterectomy to the benefits that laparoscopic hysterectomy may offer.

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Endometrial cancer is the most common gynecological cancer accounts for approximately 6% of all cancers in the women and the fourth most common form to affect women.^{1,2} Where appropriate, surgery is the initial treatment for both early and advanced disease, with the latter case, surgery is palliative rather curative.³⁻⁵ Survival rates are generally good, not only for those with early disease, but also in cases of significant minority of women with high risk conditions or advanced disease.⁶ Overall, the 5-year survival rate is approximately 80%, which is better than that seen for other cancers,⁷ counters the false perception that endometrial cancer is not as severe as other cancers.⁸ Fortunately, in 75% of patients, the disease is confined to the uterine body, often classified as early stage endometrial cancer.^{7,8} Notwithstanding, the incidence of this disease is increasing.^{2,7} Therefore, renewed efforts to improve the outcomes are warranted. Surgery is the first standard treatment step consisting of peritoneal washings, total extrafascial hysterectomy, bilateral salpingo-oophorectomy, and in certain cases, pelvic and para-aortic lymph node dissection.^{9,11,12} Lymph node dissection has been practiced for staging of endometrial cancer since 1988, although recent guidelines established lack of support for such step. In accordance with the guidelines of the International

Federation of Gynecology and Obstetrics (FIGO),¹³ radical or modified radical hysterectomy is the surgery of choice in special cases. Where there is cervical stromal involvement, myometrial invasion reaching the serosal surface radical or modified radical hysterectomy is called upon.^{14,15} The surgical steps can be completed either by the total laparoscopic hysterectomy (TLH), or by the traditional total abdominal hysterectomy (TAH), in addition to bilateral salpingo-oophorectomy (BSO) + pelvic lymphadenectomy (PLA). Many studies have reported that laparoscopic surgery had the same results with less morbidity compared to conventional laparotomy,¹⁴⁻²⁰ and the recent application of the laparoscopic surgical techniques to gynecological malignancies have made this approach useful in treating patients with endometrial cancer.²¹ Although, laparoscopy has been reported to provide exact staging and effective treatment of endometrial carcinoma, shorter hospital stay, earlier recovery, and better quality of life.^{22,23} The traditional method provide better results in certain cases and indications.^{24,25} Vaginal hysterectomy approach does not guarantee adequate adnexal management or thorough exploration of the peritoneal cavity and its contents.^{6,15,24,25} Since there is no clear consensus on the advantages of TLH versus TAH, a systemic review of the literature was undertaken. The current review concerns the surgical management of early stages of endometrial carcinoma. For the preceding purpose, the authors selected 8 published studies, aiming principally to focus, to compare, and to analyze the results of these studies. All studies reviewed herein were compared with the results of the laparoscopic assisted approach (Group I) versus the traditional abdominal approach (Group II), in light of the fact that patients in the selected studies were homogenous in terms of age, body mass index (BMI), stage of the disease, and the percentage of patients treated in each approach in every study.

The data were collected and analyzed. Statistical Package for Social Sciences Version 10.0 was used for statistical analysis. Categorical variables were compared using the Chi-square test and Fisher's exact tests. Mean, median, and standard deviation were calculated for continuous variables and a *p* value <0.05 was considered to indicate a satisfactory significant difference. The selected studies subject of this review covered a total number of 980 patients. All cited patients were proven to have endometrial carcinoma underwent surgical management as clearly illustrated in Table 1. A total of 448 (45.7%) of the patients were treated by the TLH + BSO + LPLA. The aforementioned group of patients in this review will be referred to as

Group I. The remaining 532 (54.3%) of the patients were treated by the traditional laparotomy procedure; TAH + BSO + PLA, which group of patients will hereinafter be referred to as Group II. All patients in the selected articles were diagnosed to have an early stage of endometrial carcinoma. There was no significant difference in the mean age between both groups (57.51 versus 57.09) as illustrated in Tables 2 & 3. Insofar as the mean BMI, there was no significant difference in both groups (Group I: 29.25 versus Group II: 29.22) with the exception of 2 studies^{15,18} as there was no mention of such parameter whatsoever. There was a significant difference in the mean operative time between both groups (Group I: 149.79 versus Group II: 132.72) which difference was in favor of long operating time in Group I of patients by comparison to the Group II in most of the relevant studies. Except for 2 studies,^{17,18} the operating time was longer in Group II. In previous studies,^{17,18} the longer operating time was predominantly due to marked pelvic adhesions, which in turn required longer time to perform lysis of adhesions to complete the procedure. There was no difference in one study²² as no pelvic lymph nodes dissection was performed. There were conversion of procedure from Group I to Group II in most of the studies involved in this review, 2 cases were converted in 3 studies,^{15,16,22} 5 cases in one study,²⁰ 10 cases in one study,¹⁷ no cases in 2 studies,^{18,21} and this parameter was not mentioned in one study.¹⁶ There was a significant difference in the mean rate of blood transfusion between both groups in most of the reviewed studies; it was higher in Group II (4.5 versus 2.5 units). There was marked significant difference in both groups regarding the mean hospital stay in all the reviewed studies; it was higher in the Group II (8.56 versus 5.18 days). In relation to the main intraoperative complications as seen in Tables 2 & 4, there was no significant difference in both groups in each study for the main parameters selected and mentioned, which involve injury to the bladder or major vessel, but in spite of that there was a significant difference in the intraoperative bleeding complication in Group II compared to Group I in most of the studies involved in this review; (18 versus 13 cases) as well as the bowel injury (4 versus 2 cases) which impacted mainly on the nature of the procedure and the medical conditions of the selected cases. Concerning the postoperative complications (as outlined in Tables 2 & 5), there was a significant difference between both groups in all selected studies insofar as the rate of wound infection is concerned whereas such rate was higher in the Group II. The total cases of wound infection in Group I were 6 cases (range 0-3), whilst the total cases in Group

Table 1 - Number of cited patients proven to have endometrial carcinoma that underwent surgical management.

Group	Number of patients								Total n (%)
	Fram ¹⁵ (n=11)	Ghezzi et al ¹⁶ (n=12)	Kim et al ¹⁷ (n=13)	Cho et al ¹⁸ (n=14)	Obermair et al ¹⁹ (n=15)	Zorlu et al ²⁰ (n=16)	Volpi et al ²¹ (n=17)	Tollund et al ²² (n=18)	
1	29	38	74	165	47	26	41	28	448 (45.7)
2	32	37	168	144	31	26	36	58	532 (54.3)
Total	61	75	242	309	78	52	77	86	980 (100)

Data are expressed as number

Table 2 - The statistical analysis of the reviewed variables.

Variables	Group I	Group II	P-value	Remark
Mean age (years)	57.51 (26-76)	57.09 (29-77)	0.111	NS
Mean body mass index (BMI)	29.25 (18.9-42.4)	29.22 (18.8-55.4)	0.224	NS
Mean operative time (minutes)	149.79 (90-175)	132.72 (90-170)	0.001	S
Mean hospital stay(days)	5.18 (2-12)	8.56 (5-23)	0.001	S
Mean blood transfusion (units)	2.57 (0-17)	4.29 (0-25)	0.266	S
Total number of bowel injuries cases	2 (0-1)	4 (0-2)	0.032	S
Total number of bladder injury	3 (0-1)	3 (0-2)	0.554	NS
Total number of vessel injury	3 (0-2)	0	0.001	S
Total number of intraoperative bleeding	13 (0-5)	18 (0-8)	0.015	S
Total number of wound infection	6 (0-3)	42 (0-15)	0.001	S
Total number of coagulation problems	2 (0-2)	8 (0-3)	0.002	S
Total number of postoperative hernia	2 (0-1)	2 (0-4)	0.555	NS
Total number of post bleeding	5 (0-4)	4 (0-2)	0.772	NS
Total number of others	9 (0-5)	39 (0-19)		NA
Total number of lymph nodes obtained	20.71(15.06-27.40)	19.25 (07.00-26.70)	0.612	NS

S - significant, NS - not significant, NA - not applicable

Table 3 - Main characteristics of comparisons in the included studies.

Characteristics	Group	Fram ¹⁵	Ghezzi et al ¹⁶	Kim et al ¹⁷	Cho et al ¹⁸	Obermair et al ¹⁹	Zorlu et al ²⁰	Volpi et al ²¹	Tollund et al ²²	Mean
Age (years)	1	61.2	60.45	50.00	50.00	54.60	56.60	63.20	64.00	57.51
	2	60.6	62.11	51.90	53.00	56.90	54.90	54.80	62.50	57.09
Body mass index	1	25.7	32.81	25.60	39.70	NM*	24.40	27.30	NM*	29.25
	2	26.2	31.99	26.20	40.10	NM*	26.20	24.60	NM*	29.22
Operative time (min.)	1	145.5	164.91	154.90	146.60	139.30	155.00	143.60	091.00	149.79
	2	101.9	129.97	166.20	150.50	126.80	144.00	109.70	092.00	132.72
Change to laparotomy	2	2.0	2.00	10.00	0.00	5	NM	0	2	
Hospital stay (days)	1	2.30	5.04	9.50	10.20	4.40	4.10	3.18	2.70	5.18
	2	5.50	7.06	14.30	15.50	7.90	8.20	4.59	5.40	8.56
Blood transfusion	1	1.0	0	14.00	0-3	1	NM	0	0	2.57
	2	2.0	4.00	18.00	0-7	1	NM	0	1	4.29

NM - not mentioned

Table 4 - Main intraoperative complications in the included studies.

Complications	Group	Fram ¹⁵	Ghezzi et al ¹⁶	Kim et al ¹⁷	Cho et al ¹⁸	Obermair et al ¹⁹	Zorlu et al ²⁰	Volpi et al ²¹	Tollund et al ²²	Total
Bowel injury	1	0	0	1	1	0	0	0	0	2
	2	0	2	1	0	0	0	0	1	4
Bladder injury	1	0	0	2	1	0	0	0	0	3
	2	0	2	0	0	0	0	0	1	3
Vessel injury	1	0	0	2	1	0	0	0	0	3
	2	0	0	0	0	0	0	0	0	0
Bleeding	1	0	2	5	5	1	0	0	0	13
	2	2	3	8	3	0	0	0	2	18

Data are expressed as number

Table 5 - Main postoperative complications obtained from other studies.

Complications	Group	Fram ¹⁵	Ghezzi et al ¹⁶	Kim et al ¹⁷	Cho et al ¹⁸	Obermair et al ¹⁹	Zorlu et al ²⁰	Volpi et al ²¹	Tollund et al ²²	Total
		Wound infection	1	0	1	1	0	3	0	
	2	2	5	8	5	15	5	0	2	42
DVT/PE	1	0	0	0	0	2	0	0	0	2
	2	0	1	3	3	0	0	0	1	8
Hernia	1	0	0	1	1	NM	0	0	0	2
	2	0	0	0	0	NM	1	1	0	2
Bleeding	1	4	0	0	0	NM	NM	1	0	5
	2	2	0	0	0	NM	NM	0	2	4
Others	1	0	0	0	3	5	NM	0	1	9
	2	0	3	19	16	1	NM	0	2	39

NM - not mentioned, DVT - deep venous thrombosis, PE - pulmonary embolism

Table 6 - Mean total number of lymph nodes obtained from other studies.

Group	Mean number of lymph nodes								Total (mean)
	Fram ¹⁵	Ghezzi et al ¹⁶	Kim et al ¹⁷	Cho et al ¹⁸	Obermair et al ¹⁹	Zorlu et al ²⁰	Volpi et al ²¹	Tollund et al ²²	
1	21.30	15.06	27.10	27.40	20.00	18.20	15.90	Not mentioned	20.71
2	21.90	13.52	26.70	23.90	07.90	21.10	19.70	Not mentioned	19.25

II was 42 cases (range 0-15). Wound infection was markedly higher in study,¹⁹ where 15 patients out of 31 patients developed this complication. An incisional hernia was reported in 2 cases in Group I^{17,18} and 2 cases in Group II,^{20,21} with no comments reported on this complication in study.¹⁹ There was a significant difference in the development of coagulation disorder in the form of deep venous thrombosis or pulmonary embolism in Group II in most of the selected studies; the high incidence in Group II being clearly related to the pelvic manipulations during the surgical procedure. Two cases reported this complication in Group I.¹⁹ Tables 2 & 6, set out the mean average number of lymph nodes obtained from both sides of the pelvis in each study, with a total mean (20.71 versus 19.25), thus indicating there was no significant difference by either approaches with the exception¹⁹ where there was a significant difference in the mean number of lymph nodes obtained in Group II compared to those obtained in Group I (20.0 versus 07.90). However, previous study²² reported that the mean total number of lymph nodes obtained in Group II was much higher than the mean number obtained in Group I (19.7 versus 15.9). The aforementioned parameter had no detailed mention in one of the study²¹ with the only statement being made in the study that there was no difference in the total mean number of lymph nodes between both groups.

The plan of management in cases of endometrial carcinoma is based on 2 facts: The first fact is that surgery

is the first standard treatment step, particularly for the early stages, and secondly, since 1988, the endometrial cancer has been surgically staged.^{12-15,26,27} Surgery means: peritoneal washings, extrafascial hysterectomy, BSO ± PLA.¹²⁻¹⁴ Based on the 2 afore-stated facts, the assessment of pelvic lymph node status is essential for proper staging and proper plan of management. Lymph node dissection is theoretically a simple procedure in the opened surgery technique. Therefore, most efforts have been focused on demonstrating the ability to perform lymphadenectomy laparoscopically.^{15,26,27} Thereafter, and since the famous encouraging report by Childers and Surwit²⁸ relating to the successful management of 2 cases of stage I endometrial cancer using the combined laparoscopic and vaginal procedure, several reports have been focused on this interesting technique to highlight the benefits of the combined laparoscopic procedure over the traditional opened approach.²⁹⁻³² Notwithstanding, this promising achievement should not be over ranked in any case, as the traditional approach remains a fallback option for the laparoscopic one regardless of the indication or the patient situation.

One can safely conclude that TLH + BSO + LPLA in management of endometrial carcinoma is feasible and safe, resulting in shorter hospital stay, minimal blood loss, but longer operating time for patients regardless of their BMI. The additional time required in the aforementioned approach is basically for the purpose of freeing the tissues at the pedicles, and to apply the stitches at these pedicles. Although the mean time duration of

surgery will be longer when pelvic lymphadenectomy performed,¹⁸ represented the exception due to the fact that no lymph node dissection was performed. The requirement for lengthier time factor was also confirmed in most studies published in this regard.^{15,25,32,33} The short hospital stay is another advantage of this method personal or economic wise, in addition to the fact that the patients can regain their activities much quicker as evidenced in Group I.^{15,24,25,32,33} Consistency in the multidisciplinary team assisting in Group I procedures allowed for sustained and continuous progress in the learning curve in the sense of gain of surgical skills and cooperation of the team members; hence, reduction in the operation time. However, adequate laparoscopic surgery is a complex procedure requiring experience and specific skills when compared to the traditional one. The preceding statement is based on, and is the result of, a number of factors, those being: the 2 dimensional representations of the operative site, limited tactile feedback, and the need for surgeons to learn different hand-eye coordination skills.^{15,32,33} It was clear from the discussion in most of the analyzed studies in this review that the shorter operative time needed to complete the surgical staging in the last operated cases by the same team among the group, translated into a positive correlation between the roles of the members of the surgical team with the true skills applied to obtain the final result. This observation could be applicable to explain the less morbidity and the less intraoperative complications together with limited need for intraoperative blood transfusion. All these observations were concluded and confirmed by several reports.^{32,33} A very interesting and promising result obtained from the analysis of the articles in this review was that in the gradual increase in the total mean number of lymph nodes obtained by the first approach as mentioned in other reports.^{7,10,11} Evidently, the number of lymph nodes was equal in both approaches as there was no significant difference between the 2 approaches, which again could be attributed to the proper application of the surgical laparoscopic skills by the trained people together with the proper selection of the cases for this approach.³⁴⁻³⁹ This result highlighted a potential benefit of the new approach, which clearly proved that the duration of surgery has been decreased over time with greater laparoscopic surgical experience.^{15,35,36} This fact sent a clear message for the new generations of the gynecological oncologists that adequate supervised and proper training in the laparoscopic approach and owing to the availability of the suitable laparoscopic setup instruments are a must to complete the procedure safely, effectively, and professionally. This may help to replace

the traditional known approach for most of the patients who require removal of the uterus and ovaries + the pelvic lymph nodes, and this idea was conformed and suggested by others,^{36,37} as the management procedure became easier with the possibility of application of all the surgical steps needed. The fact that minimal blood loss and minimal need for blood transfusion needed in Group I added an extra advantage to this method as it avoided the possible complications and disadvantages of the blood transfusions. This fact was expressly clear in the articles selected by the authors and as also recommended by others.³²⁻³⁷

It is apparent in the authors' review the absence of significant disadvantages of the second approach versus the first one, plus there is a significant conversion of cases from the first approach to the second one as the mean conversion rate in our review ranges between 0 to 10 cases, and this observation was also noted by others where there were 12 cases in Zullo et al study³⁷ converted from the first approach to the second one; 5 cases due to intra-peritoneal disease, 3 cases due to anesthesiologists indication, 2 cases due to severe adhesions, one case due to bowel lesion, and another case due to improper preparation. Moreover, in the published study by Fanning et al,⁴⁰ out of 235 cases underwent the laparoscopic approach, there were 6 conversions to laparotomy or vaginal hysterectomy secondary to inadequate visualization because of inability to maintain adequate trendelenburg position.⁴⁰ In spite of these benefits, it should be asserted that the laparoscopic procedures cannot totally replace the traditional one in every case of early endometrial carcinoma. There are cases that can only be completed safely through the traditional open approach. This is particularly when there is suspension of marked pelvic adhesions. This approach is a reserve one to replace the laparoscopic approach in many cases, such as when there is uncontrollable bleeding, difficult dissection and/or marked obesity. Most of the studies in this review mentioned a reasonable conversion rate of cases from Group I to Group II as this parameter significantly differs in its *p*-value.^{15-18,40}

The safety and efficacy of the technique should be the foremost consideration when the plan of management discussed to choose the best operative strategy which enables the surgeon to decide for the proper way that is suitable for the individual case bearing in mind that not all cases are suitable candidates for the laparoscopic approach, but all cases are candidates for the traditional approach. There is a list of limitations to apply the laparoscopic approach safely, as none of the analyzed studies was lacking cases converted from the

laparoscopic approach to the traditional one. This fact was also confirmed by the early published reports^{25,30,33} and in the most recent reports,^{7,8,10,24,32,39,40} on this issue. Unfortunately, in all of the above analyzed studies, and in similar reports published recently, none of them was a blind one, a matter that is difficult to achieve in surgical trials.^{1,2} Although multicenter randomized trials and long term following are required to advocate the overall oncologic outcomes of this procedure, one cannot pronounce a final judgment on the safety of this procedure to replace the well known traditional one.

It is imperative to stress upon the remarkable benefits of laparoscopic procedure as being the method of choice for surgical management of early stages of endometrial cancer, in particular for those group of patients who are categorized to be in the obese zone. Having a BMI up to 35 guarantees harvesting all positive advantages of this skillful technique, or at least avoiding the negative impacts of the traditional procedure. This conclusion is clearly apparent in many recent publications concerning this issue to make it an attractive, alternative and a fruitful one,⁴¹⁻⁴⁶ notwithstanding that one recent study did not support this notion due to the lack of randomized data.⁴⁷ Nevertheless, the advantages of the laparoscopic procedure should not be over-glorified; it should rather be a subject of discussion owing to the lack of universal guidelines specifically but without limitation, in view of the frank argument of many recent publications for the obese patients having a BMI more than 36.⁴⁸⁻⁵⁰ Nonetheless, it should be kept in mind that the procedure appears suboptimal for the advanced stages.⁵¹ Should laparoscopic procedure be performed in instances where the BMI is more than 35, the rate of conversion to the laparotomy group is increased and negatively influences the decision to perform lymph node dissection, not to perform lymph node dissection due to the technical difficulties.^{49,52} Although the value of laparoscopic surgery for management of early stages of endometrial cancer has been discussed controversially, improving the surgical skills via guidelines for proper patients selection, skillful surgical team with appropriate experience in endoscopic, and oncological surgery to offer the patients therapeutic advantages, is a topic worthy of concern.^{47,49,51,53}

In conclusion, while no woman wants to face surgery in its broader context, today the vast majority of gynecological conditions could be managed via laparoscopic approach, which approach offers numerous potential benefits over the traditional open surgery. Every gynecologist oncologist can perform the surgical steps perfectly via the traditional open surgical approach in the early cases of endometrial carcinoma, but not

every gynecologist oncologist can perform perfectly the surgical step via the laparoscopic approach in the early cases of endometrial carcinoma, and the learning curve of the surgical team in gaining the laparoscopic skills calls for additional effort and training to perform the procedure safely; as to make the benefits of the procedure well worth it while.

A proper assessment by pelvic surgeons wanting to adopt this approach of their abilities and practice must be carried out with utmost precision before divulging in such venture. Pelvic surgeons must base their selection of hysterectomy route on their experience, skills, track record, the indication for surgery, and the patient's anatomy. Nonetheless, most of the data on route for hysterectomy remain from retrospective and uncontrolled trials, the findings must be interpreted carefully. The surgeon usually selects the technique based on personal preference, practice style, and traditional dogma such as uterine size rather than a standard protocol. Therefore, the operative approach is selected individually according to the surgeon's experience, pelvic pathology or operative indication, availability of laparoscopic instruments and in most likely, a combination of these factors. In spite of that, laparoscopic approach cannot completely replace the traditional approach for surgical management of early stages of endometrial carcinoma.

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