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Power morcellation for women undergoing laparoscopic supracervical hysterectomy — safety of procedure and clinical experience from 426 cases

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ABSTRACT

Objectives: Minimally invasive gynaecological surgeries are performed for several malignant and nonmalignant indications. The aim of our study was to evaluate the rate of unexpected malignancies among women who underwent laparoscopical supracervical hysterectomy (LASH) with power morcellation.

Material and methods: The retrospective analysis included clinical data of 426 consecutive female patients who underwent LASH with power morcellation due to presumed benign disorders (78.4% — symptomatic uterine fibromas, 12.7% — abnormal uterine bleeding, 8.9% — suspicion of uterine adenomyosis) between January 2011 and December 2015. Premalignant or malignant preoperative abnormalities in the cervix and the uterine corpus were contraindications for LASH.

Results: The unexpected malignancies were found in four patients from study group: one ovarian cancer located on the inner part of simple ovarian cyst and 3 endometrial carcinomas (0.9%) were documented. All these patients underwent abdominal reoperations and no histological abnormalities were detected in the extirpated cervix and adnexa.

Conclusions: The incidence of unintended endometrial carcinoma in morcellated uterus after LASH was relatively small. However, careful pre-operative counseling should be undertaken in order to exclude the possibility of any malignant disease in uteri among women scheduled to power morcellation.

Key words: laparoscopic assisted supracervical hysterectomy, power morcellation, myoma, minimally invasive gynecological surgeries

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INTRODUCTION

In current gynecological practice, hysterectomy belongs to the standard procedures for several malignant and nonmalignant indications and is one of the most commonly performed surgeries [1–3]. However, with technological progress in the 21st century, total abdominal hysterectomy as a primary intervention for benign indications belongs to the past. Supracervical hysterectomy, as less invasive, is an alternative to total hysterectomy for benign uterine disorders, however the American College of Obstetricians and Gynecologists (ACOG) does not recommend this procedure as superior to total hysterectomy [4]. With appropriate preoperative consulting, even large uteri can be surgically removed with laparoscopic assistance either transvaginally or totally laparoscopically. Of course, even today the majority of malignant diseases of the cervix, uterus, tubes or ovaries are still primary indications for open abdominal surgery; however, the number of centres which are able to safely use advanced laparoscopic techniques for malignant disease of the cervix and uterus is growing. Since 1989, when first laparoscopic hysterectomy was performed, the laparoscopic supracervical approach to hysterectomy (LASH) has become very popular both in Europe and the United States [5, 6].

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However, in 2014, the Food and Drug Administration (FDA), due to safety concerns, namely the possibility for intraperitoneal dissemination of occult uterine malignancies that may occur via morcellation during hysterectomy and myomectomy, issued a statement that the power morcellation should be contra-indicated in "the majority of women" due to the potential risk of spreading occult uterine sarcoma [7]. This was partially in agreement with a previously published statement by the American Association of Gynecologic Laparoscopists that in the case of known or suspected uterine malignancy, morcellation is contraindicated [8]. Of course, the difference between these two statements is obvious and critically important for general clinical practice because, according to FDA statement, gynecological surgeons should abandon all procedures (except total abdominal hysterectomy) commonly used for the surgical treatment of symptomatic leiomyomas keeping in mind that occasionally a small risk of spreading occult cancer exists. These procedures include: vaginal hysterectomy (scalpel morcellation very often used to decrease the size of uterus), mini-laparotomy hysterectomy (scalpel morcellation often necessary), laparoscopic hysterectomy (scalpel morcellation), laparoscopic supra-cervical hysterectomy (cervix cut-through and power or scalpel morcellation obligatory), open supracervical hysterectomy (cervix cut-through), laparoscopic myomectomy (power or scalpel morcellation obligatory), mini-laparotomy myomectomy (scalpel morcellation very often necessary), hysteroscopic myomectomy (intrauterine morcellation obligatory), uterine artery embolization (no specimen and no histopathological diagnosis with possibility of delayed optimal treatment in the case of unexpected malignancy), high-intensity focused ultrasound (no specimen and no histopathological diagnosis with possibility of delayed treatment in the case of malignancy). Therefore the pivotal question is how often can we really expect occult malignancy when the power morcellation is used during supracervical hysterectomy performed due to potentially benign indications.

OBJECTIVES

The aim of our study was to evaluate the rate of unexpected malignancies among women who underwent supracervical laparoscopic hysterectomy with power morcellation due to presumed benign conditions.

MATERIAL AND METHODS

The study protocol was approved by the local institutional ethical committee. Between January 2011 and December 2015 — 426 LASH procedures were performed due to presumed benign indications (Table 1). In this retrospective study we evaluated all cases of unexpected occult malignancies in patients after LASH. Main indications for LASH were the symptomatic uterine myomas or dysfunctional uterine bleeding resistant to conservative therapy. All patients were preoperatively vaginally examined including a speculum visualization of the cervix and vaginal sonography was also performed. In the case of sonographic endometrial abnormalities, a diagnostic endometrial aspiration biopsy or dilatation and curettage were performed before surgery. A cervical PAP test, performed within 1 year before surgery, was available for every patient. Premalignant or malignant preoperative findings in the cervix and the uterine corpus were considered as contraindications for LASH. Standardized LASH operation technique with electric power morcellation was used in order to remove the uterine corpus [9]. We also routinely removed both oviducts in order to reduce the probability of ovarian functional cysts and future malignancy [10]. All tissue specimens were fixed in 10% buffered formalin for at least 24 hours and sent to the Department of Clinical Pathomorphology. The specimens were counted, measured and grossly examined before and after sectioning for identification of basic anatomical structures and pathological lesions. Then, specimens were sampled according to the following protocol, i.e. (a) 1–2 samples from intact smaller fibromas or at least one sample from each fragment of morcelled fibromas, especially from abnormally looking areas, (b) one from grossly unaffected myometrium or 2–3 in the case of macroscopic suspicion of adenomyosis and (c) 1–2 from grossly normal endometrium in the case of no clinical suspicion of endometrial pathology, at least 2–3 samples including one through entire uterine wall (if possible) in grossly visible endometrial tumours or the whole endometrium in the suspicion of hyperplasia. Furthermore, three samples from each fallopian tube and

Table 1. Indications for laparoscopical supracervical hysterectomy (LASH) and number of the past five years

Indications for surgery	2011 (n = 8)	2012 (n = 31)	2013 (n = 146)	2014 (n = 117)	2015 (n = 124)	Total 2011–2015 (n = 426)
Uterine fibroids	5	26	111	93	99	334
Adenomyosis	2	3	14	8	11	38
Abnormal uterine bleeding	1	2	21	16	14	54

1–2 from each ovary when they were provided. Generally, the number of samples depended on initial clinical diagnosis and gross examination of each particular case. All samples were routinely processed to the paraffin blocks, sectioned and stained using haematoxylin and eosin and then microscopically examined.

RESULTS

Patients' data from 426 LASH operations with electric power morcellation were evaluated. The indications for surgery in 334 patients (78.4%) were symptomatic uterine fibromas, in 54 patients (12.7%) abnormal uterine bleeding, in 38 patients (8.9%) suspicion of uterine adenomyosis. One case of intra-operative complication (small bowel laceration) was caused by use of the morcellator. In total, four unexpected malignancies were found among patients from the study group: one ovarian cancer located on the inner part of simple ovarian cyst (in that case adnexectomy was performed before LASH and adnexa were removed in an endobag), and 3 endometrial carcinomas (0.9%). All these patients underwent open reoperations and no histological abnormalities were detected in the extirpated cervix and adnexa (Table 2).

DISCUSSION

When surgery for presumed benign fibroids is performed there is always a big concern regarding the risk of occult leiomyosarcomas (LMS) found later in a histopathological specimen. The presented data show a rather low uterine malignancy rate in patients undergoing LASH. In fact, in our study group, we did not find any of the most aggressive tumours (stromal sarcoma or leiomyosarcoma) with a really bad prognosis. On the other hand, FDA estimated that for every 458 women having surgery for fibroids, one woman would be found to have an occult leiomyosarcoma, and this risk even increase to 1 in 352 for any sarcoma [7]. Fortunately, this was not found in our material, but it should be mentioned that in our study population, ultrasound findings of a large irregular vascular mass, with anechoic (cystic) areas reflecting necrosis within myomas where contraindication to LASH existed, because such pictures are suspicious for LMS. Recently, at least two big studies also challenged the FDA statement concerning the presumed risk of occult uterine malignancy during LASH operation. Pritts et al. published a meta-analysis of 133 studies and determined that the prevalence of LMS among 30,193 women having surgery for presumed benign fibroids was 1 in 1.960, or 0.051% (95% CI: 0.16–0.98) or approximately 1 in 2.000 operations [11]. Also, Bojahr et al. reported a very low rate of LMS among 10,731 women who underwent a laparoscopic supracervical hysterectomy mainly due to symptomatic uterine myomas with subsequent electric power morcellation between 1998–2014 [12]. In such big cohorts, the authors reported 6 sarcomas (0.06%), including 4 endometrial stromal sarcomas (0.04%), 2 leiomyosarcomas (0.02%), and 8 endometrial cancers (0.07%). This yielded a relatively low total uterine malignancy rate of 0.13%. Moreover, during median follow-up of 65.6 months (13–169 months), no recurrence was reported in any patients with endometrial cancer and 5 out of 6 sarcoma patients. Only one patient diagnosed with leiomyosarcoma died 13 months after LASH due to peritoneal and bone metastases. Obviously, due to the rarity of these malignancies the data on the prevalence of sarcoma in morcellated specimens are limited and even fewer studies have focused on the real influence of power morcellation on the survival rate in patients who underwent such an unintentional procedure during primary surgery [13–15]. In another analysis of re-operation rates after LASH, it was found that extirpations of the cervical stump were performed in 2 women (0.66%) due to leiomyosarcomas in the morcellated uterus [16].

Table 2. Histopathological findings after laparoscopical supracervical hysterectomy (LASH) and after second-look laparotomy

Patient data	Histopathological report after LASH	Histopathological report after second-look laparotomy (remnant of the uterus or other localization of pathology)
Patient 1. (57 yrs)	Endometrial adenocarcinoma G1 limited to the endometrium	Simple endometrial hyperplasia and in part complex endometrial hyperplasia with atypia Chronic cervicitis Normal ovaries
Patient 2. (53 yrs)	Endometrial adenocarcinoma G1 in situ	Proliferative endometrium and in part secretory endometrium Chronic cervicitis Normal ovaries
Patient 3. (57 yrs)	Endometrial adenocarcinoma G1	Proliferative endometrium in part leiomyoma Chronic cervicitis Normal ovaries
Patient 4. (54 yrs)	Clarocellulare ovarian cystadenocarcinoma	Peritoneum from the left side of diaphragm- small amount of dyskariotic cells probably neoplastic Normal ovaries

Pritts and co-workers challenged the question whether morcellation of occult leiomyosarcomas resulted in inferior outcomes, compared with en bloc tumour removal during an open classical surgery. The authors concluded that there is no reliable evidence that morcellation, power or manual, substantially results in upstaging of the disease [17]. Based on current literature, it seems a100% certainty that before an operation we can exclude the possibility of the occurrence of occult malignancy being almost unattainable, but of course, every effort should be undertaken to achieve this goal. The main challenge with triaging patients to the appropriate minimally invasive surgery (LASH with power morcellation) or classical open surgery is identifying patients with uterine sarcomas and endometrial carcinomas. This could be achieved using various imaging techniques, endometrial sampling, and performing a thorough physical examination during preoperative evaluation of patients with uterine and intrauterine masses. Of course, in order to exclude intrauterine malignancy, the best way is to obtain endometrial biopsy which should always be performed along with measurement of endometrial thickness by trans-vaginal ultrasonography (TVU) in any case of abnormal uterine bleeding [18]. In the nested case-control study of postmenopausal women (over 48.000 participants) endometrial thickness and endometrial abnormalities were recorded. The analysis performed only in women with endometrial cancer without postmenopausal bleeding and with a cutoff of 5 mm showed sensitivity of 77.1% and specificity of 85.8%. This study has proved the usage of trans-vaginal ultrasonography as a screening tool in postmenopausal women [19]. In a large retrospective meta-analysis it was found that the detection rate for endometrial carcinoma with endometrial biopsy was 99.6% in postmenopausal and 91% in premenopausal women [20]. The good (but of course not ideal) correlation between preoperative endometrial sampling and postoperative histology was also proved for the endometrioid histology subtype. Unfortunately, such a correlation was observed only in 40% for sarcomas. The sensitivities of pre-operative curettage and pipelle biopsy for identifying endometrioid and non-endometrioid cancers were 96.5% and 86.5%, respectively [21]. One of the most common challenges during the endometrial sampling procedure is to obtain a good quality and sufficient tissue sample. In the large retrospective study, histological findings were analyzed in 17.552 samples collected during endometrial curettage (EMC) and endometrial biopsy (EMB). There was no statistical difference between samples reported as non-diagnostic between EMB (6.4%) and EMC (6.5%) groups. Repeat sample collection procedures were performed in 38% of patients with non-diagnostic results of initial biopsy. Malignant findings were described in 5% of them; moreover, one-fourth of repeated biopsies were still insufficient. Seven percent of patients with initial non-diagnostic specimens had undergone hysterectomy and in 35% postoperative histopathological reports revealed the uterine malignancy. The authors underlined that comments of pathologists, especially if any abnormal findings in non-diagnostic specimen were observed, may help in further repeated diagnosis and management. In this study, any abnormal histologic findings in initial, non-diagnostic endometrial sample were associated with uterine malignancy in 43% of patients [22]. In another prospective multicenter study the endometrial sampling in 29.8% was non-diagnostic due to an insufficient amount of endometrial tissue. In over one-fifth of patients with technically failed samples the endometrial malignancy was diagnosed. In six patients (7.1%) from the group with an insufficient sample amount the endometrial cancer was observed. The risk factor for technical failure was associated with nulliparity, and also the advanced age of the patients increased the risk of an insufficient sample [23]. An even bigger clinical problem with proper preoperative diagnosis is commonly encountered with uterine sarcomas and leiomyosarcomas, mainly because of the distribution of these lesions within the myometrium. The reported sensitivities of dilatation and curettage within 33–67% are far from ideal [24, 25]. Currently available clinical data clearly indicate that rapid enlargement of the uterus, which traditionally was considered as a characteristic of presumed malignancy is not a reliable predictor associated with sarcoma, but on the other hand, a stable size of presumed fibroids during several months of observation make a sarcoma highly unlikely [26, 27].

In current gynecological practice, ultrasonography due to its sensitivity, accessibility, and relatively low cost is the first line imaging technique when evaluating patients with uterine abnormalities before operation. However, in cases of mesenchymal malignant tumours sonographical scanning is much less reliable even if sarcomas presents certain features such as mixed echogenic parts, central necrosis, and irregular vasculature on Doppler evaluation [28, 29].

Also, magnetic resonance imaging (MRI) is not 100% reliable in the diagnosis of mesenchymal tumours. It has been shown that high signal intensity and ill-defined margins are very often encountered, but neither is a reliable indicator of malignancy [30, 31].

Recently, the European Society of Gynaecological Endoscopy published an official statement and practical recommendations on fibroid morcellation based on the current level of available evidence. According to the authors, the currently available level of evidence is not sufficient to give exact recommendations; however, they presented a flowchart to offer a structure in the clinical management. In the case of patients scheduled for electric power morcellation tissue necrosis and high vascularity visible on TVU

are contraindications for this procedure. If tissue necrosis and high vascularization is not present and the patient is < 40 years, morcellation is not contraindicated, but in patients > 40 years old additional safety reassurance should be performed, taking into account menopausal status, presence of abnormal uterine bleeding, elevated lactate dehydrogenase level and the size of the largest fibroid > 8 cm [32].

Correct histopathological diagnosis of specimens after morcellation requires evaluation of multiple samples, preceded by careful macroscopic examination by an experienced, observant pathologist. Since specimens are usually largely fragmented, deformed and especially after power morcellation, partly thermally damaged, gross evaluation is difficult and may lead to inadequate sampling. Therefore, false negative results of microscopic examination may be the consequence of missing an important tissue piece at sectioning or too low a number of samples, especially in some mesenchymal origin tumours (leiomyoma variants, uterine smooth muscle tumour of uncertain malignant potential — STUMP), or in small or superficial endometrial carcinomas, especially growing in polyps or in endometrium deformed by big leiomyomas. Small numbers of samples taken for technical reasons form suspected uterine tumours or lower quality of sections compared to routinely processed samples, may also be the source of mistakes in frozen sections examination. Moreover, during morcellation, most of the anatomic features can be completely destroyed. All those factors can decrease the accuracy of pathological diagnosis [33].

CONCLUSIONS

Although the incidence of unintended endometrial carcinoma in morcellated uterus after LASH is relatively small, such possibility definitely exists. Therefore, careful pre-operative counseling should be undertaken in order to exclude the possibility of a malignant disease (namely leiomyosarcoma and endometrial carcinoma) among patients scheduled for power morcellation after supracervical laparoscopic hysterectomy. A diagnostic endometrial aspiration biopsy or dilatation and curettage should be considered in all patients qualified for LASH. Only such a clinical attitude accompanied by patients' informed consent will guarantee the best choice of safe treatment tailored to an individual situation.

Conflict of interest

This study was not supported by any pharmaceutical company.

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