



Does ultrasonic advanced energy reduce lymphocele incidence in laparoscopic para-aortic lymphadenectomy?



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ABSTRACT

Objective: To evaluate the use of ultrasonic advanced energy in reducing the occurrence of symptomatic lymphocele and its related complications in laparoscopic extra-peritoneal para-aortic lymphadenectomy in patients with gynecological cancer.

Study design: A retrospective cohort study of consecutive patients in a tertiary referral center identified 2 groups of patients, undergoing laparoscopic extra-peritoneal para-aortic lymphadenectomy with or without the use of ultrasonic advanced energy. Surgery time, hospital stay, number of retrieved nodes and lymphocele requiring treatment were studied. Results were also compared between trained and trainee surgeons.

Results: 163 patients were scheduled for laparoscopic extra-peritoneal para-aortic lymphadenectomy: 81 treated using bipolar energy (control group: group 1) between August 1999 and January 2005, and 82 treated using ultrasonic advanced energy (study group: group 2) between July 2010 and March 2014. The main indication (90% in group 1, 61% in group 2) was advanced cervical carcinoma (stage IB2 and above). Ultrasonic advanced energy significantly decreased operative time ($p = 0.001$) and intra-operative bleeding ($p = 0.01$) and increased the number of para-aortic nodes retrieved ($p = 0.02$). There was no significant difference in hospital stay or lymphocele requiring treatment (8.6% in group 1, 8.5% in group 2: $p = 0.98$). For senior than for junior surgeons, surgery time was shorter but not significantly ($p = 0.80$) and postoperative lymphocele rates were identical.

Conclusion: Ultrasonic advanced energy may provide benefit in laparoscopic para-aortic lymphadenectomy, facilitating surgical ergonomics, but did not decrease post-surgery lymphocele.

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Introduction

Assessment of para-aortic lymph-node status has become essential for pre-treatment staging of high-risk endometrial cancer [1,2], cervical cancer [3] and non-metastatic ovarian cancer [4]. Despite improvements in imaging (MRI, 18F-fluorodeoxyglucose PET), laparoscopic surgery remains unavoidable for pathologic analysis of para-aortic nodes [5].

Postoperative lymphoceles are lymph collections organized in cavities with or without septa, developing within the lymph-node dissection site, with onset almost always within 1 year of surgery

[6]. They are the most frequent early complication following lymph-node dissection; incidence is probably underestimated [7], with wide variation between 0% and 58.5% [3,8]. They may be complicated by infection via hematogenic pathways and lymph-node dissemination, and by organ compression and low back pain. Various techniques and energy sources have been described to improve surgical ergonomics and lymphostasis and reduce the rate of postoperative lymphocele.

The objective of the present study was to evaluate symptomatic lymphocele rates using ultrasonic advanced energy versus bipolar energy and related complications in laparoscopic extra-peritoneal para-aortic lymphadenectomy in patients with gynecological cancer.

Materials and methods

A retrospective comparative study included 163 patients undergoing laparoscopic extra-peritoneal para-aortic lymphadenectomy

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between 1999 and 2014. From August 1999 to January 2005, 81 were managed using bipolar energy and forceps-scissors (control group, group 1); from July 2010 to March 2014, 82 were managed using ultrasonic advanced energy (study group, group 2), following the device's acquisition by our department. All patients were treated in the same gynecologic oncology surgery department, by 4 surgeons trained in the technique and 2 junior surgeons. Concomitant laparoscopic procedures (hysterectomy, pelvic lymphadenectomy, omentectomy, ovary transposition) were sometimes associated in the same step, following the para-aortic lymphadenectomy. General anesthesia was systematic. There was no particular postoperative treatment or diet.

Symptomatic lymphocele was defined as onset of clinical symptoms related to accumulation of lymphatic fluid. All symptomatic lymphoceles were confirmed by CT scan and required specific treatment (Fig. 1). Para-aortic dissection in both groups used a laparoscopic left extra-peritoneal approach, following Dargent et al. [9], requiring both oncologic and endoscopic experience and involving a learning curve [10]. The principle of the lymphadenectomy was founded on strict dissection in the adventitial plane of the main vessels and the interface planes of the various adipose structures, the objective being to ensure detection of lymph-node structures so as to achieve hemostasis and selective lymphostasis. Preventive marsupialization was systematically performed at end of surgery, by creating a communication space between the retroperitoneal dissection space and the intraperitoneal space [11]. There was no post-operative drainage.

The ultrasonic advanced energy device (UltraCision Harmonic Scalpel[®], Ethicon Endo-Surgery Inc., Cincinnati, OH) was a generator delivering electrical energy to a hand-piece; a piezoelectric crystal transforms the electrical energy into mechanical energy in the form of vibration. The scalpel blade vibrates axially at a constant 50,000 Hz, producing low-temperature thermal energy that cuts and coagulates the tissue. The energy is applied directly on the tissue, providing three constantly synergic effects of cavitation, coaptation and coagulation, cutting blood and lymph vessels without necrosis. This device enables selective coagulation of the efferent and afferent channels of each retrieved node,

combining cutting and coagulation in a single step without change of instruments, improving surgical ergonomics.

Operator effects were also compared, between specifically experienced senior (>3 years' experience) and non-experienced junior surgeons.

Statistical analysis was performed on SAS software (SAS 9.1, SAS Institute Inc., Cary, NC). Categorical variables were compared on χ^2 , or Fisher's test in case of numbers less than 5, and continuous variables on Wilcoxon rank sum test. A *p* value <0.05 indicated statistically significant difference.

Results

Table 1 shows patient data. The 2 groups were comparable for mean age (50.4 in group 1, 54.0 in group 2; *p* = 0.13), body mass index (23.7 in group 1, 24.8 in group 2; *p* = 0.17) and parity (*p* = 0.92). Lymphadenectomy was indicated mainly for cervical cancer (73 patients in group 1, 53 in group 2). Pathologic analysis of cervical cancer found 54 squamous cell carcinomas, 15 adenocarcinomas and 5 other forms in group 1, and respectively, 38, 14 and 1 in group 2. Other indications comprised: restaging of 4 ovarian cancers in group 1, and 10 in group 2; 3 endometrial cancers in group 1 (including 1 endometrioid carcinoma), and 17 in group 2 (including 12 endometrioid carcinomas); 1 vaginal adenocarcinoma in group 1; and 2 fallopian tube cancers in group 2. Mean hospital stay was equivalent between the 2 groups, at 3 days (*p* = 0.17).

In group 1, 29.6% of cases had associated procedures, versus 48.8% in group 2 (*p* = 0.01). Table 2 shows total surgery times (including associated procedures) and surgery time specific to para-aortic lymphadenectomy. Fenestration with peritoneal opening was performed at end of surgery in 24 cases in group 1 (29.6%), versus 60 (73.2%) in group 2 (*p* < 0.0001) (Table 2). Para-aortic lymph-node invasion was comparable between groups: 22.2% in group 1 and 20.7% in group 2; *p* = 0.65. The number of lymph nodes retrieved by UltraCision[®] (group 2) was significantly greater than in group 1: 16 versus 13 (*p* = 0.02).

Total surgery time was shorter in group 1 (144 min) than group 2 (179 min; *p* = 0.0003), due to the lower number of associated

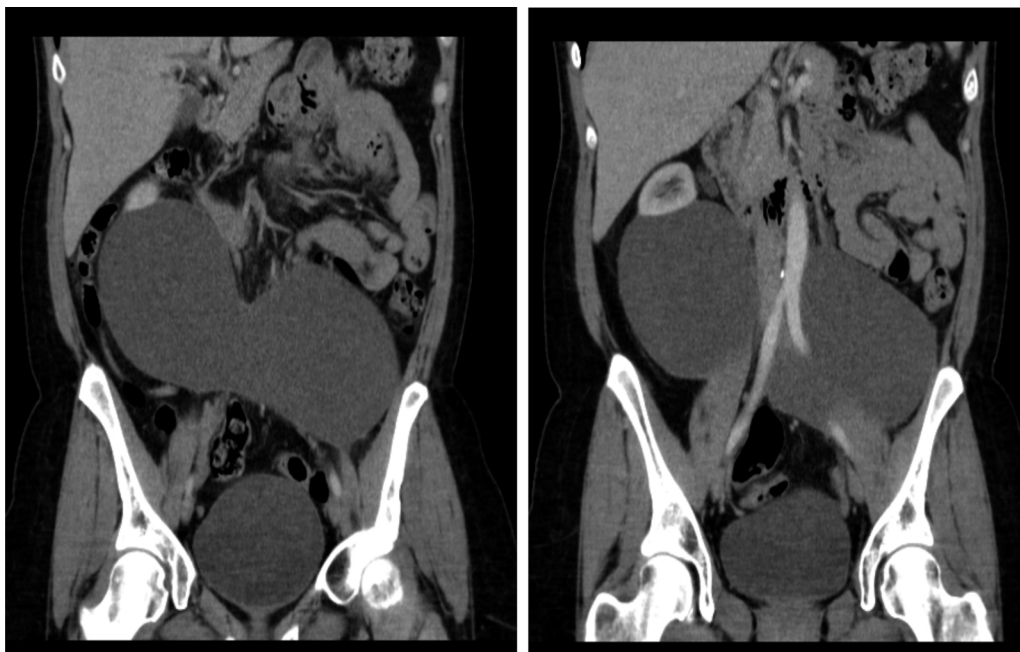


Fig. 1. Coronal CT reconstruction on 2 slices: large bilateral lymphocele.

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