

Role of Laparoscopic Ultrasound for Gynecological Malignancy

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Abstract

Laparoscopic ultrasound is initially developed to facilitate surgery for hepatobiliary and pancreatic cancers. With the advancement of laparoscopic surgery, laparoscopic ultrasound has been incorporated into laparoscopic surgery in order to combat against the limitation of laparoscopic surgery. In the management of gynecological malignancy, its role is mainly on the assessment of lymph nodes.

Keywords: Laparoscopic ultrasound, lymph nodes.

INTRODUCTION

The use of laparoscopic ultrasound has been widespread in the management of hepatobiliary and pancreatic cancers especially in assessment of resectability, resection margins and lymph nodes involvement. However, in the management of gynecological malignancy, the role is mainly for assessment of lymph nodes involvement.^{1,2}

TECHNIQUE OF LAPAROSCOPIC ULTRASOUND

The laparoscopic ultrasound probe (Panther Ultrasound Scanner System, B&K) was a 10 mm multifrequency (5.0, 6.5 and 7.5 MHz) probe with the distal end being the convex transducer, which can be bent forward and backward 180° manually by the control located at the proximal end (Figs 1A

and B). A color flow Doppler was incorporated for the differentiation between vessels (Fig. 2) and lymphatic channels or ureters.

Laparoscopic ultrasound is done under general anesthesia when diagnostic laparoscopy was performed. After a diagnostic laparoscopy which excluded gross intra-abdominal pathology which prevented a successful laparoscopic ultrasound, normal saline was instilled to create an acoustic window for ultrasound. The placement of the laparoscopic port depended on the area for visualization. The suprapubic port was used for assessment of upper abdominal region including the para-aortic lymph nodes. The umbilical port was used for assessment of pelvic region including the pelvic organs and lymph nodes.



Figs 1A and B: The convex transducer of laparoscopic ultrasound probe which can be bent forward (A) and backward 180° (B) manually



Fig. 2: Color flow Doppler incorporated for the differentiation between vessels which can mimic lymph node

CLINICAL USE IN GENERAL GYNECOLOGY

Laparoscopic ultrasound can be used in the planning of ovarian cystectomy to improve the precision of assessment of the internal characteristics of ovarian tumor so that more normal ovarian tissues can be preserved.^{3,4} Despite that, the diagnostic accuracy of borderline or malignant tumors remained unchanged when compared to other imaging techniques. It has also been reported to aid in intrauterine surgery such as diagnosis of ectopic pregnancy⁵ or used to guide hysteroscopic surgery for intrauterine lesions so as to provide a completeness of excision while reducing the risk of uterine perforation.⁶

CLINICAL USE IN GYNECOLOGICAL MALIGNANCY

In gynecological malignancy, resectability and resection margins rely on preoperative assessment. The assessment of lymph node involvement during laparoscopic surgery provides a better prediction of outcome and also overcome the limitation of laparoscopic surgery.⁷⁻¹⁰

NODAL ASSESSMENT IN MANAGEMENT OF CERVICAL CANCER

In cervical cancer, nodal involvement has significantly reduced the 5-year survival. In stage IB to IIA disease, the 5-year survival is around 81 to 96% without nodal metastasis, but is reduced to 51 to 76% with nodal metastasis. In addition, if nodal involvement was diagnosed after radical surgery, adjuvant radiotherapy is required to prevent nodal recurrence. This significantly increase the treatment morbidity such as lymphedema, urinary and bowel complications but may not have survival benefit.^{11,12}

To avoid combined treatment in this subgroup of patient, preoperative assessment of the nodal involvement is possible using radiological imaging. The use of computer tomography (CT) or magnetic resonance imaging (MRI) has been found to have sensitivity ranged from 20 to 80%.¹³ Despite that, surgery is still required to confirm or refute the findings from radiological imaging.

The use of laparoscopic ultrasound is found to have sensitivity ranged from 63.6 to 91%.^{9,10} Cheung et al⁹ in the initial series of 32 patients found a sensitivity of 91% with specificity to 100%. In the extended series of 90 patients, Cheung et al¹⁰ demonstrated that the sensitivity was reduced to 63.6%. This was caused by the inclusion of 3 patients with microscopic lymph node involvement of < 3 mm. When these cases were excluded, the sensitivity was 82.3%, which is comparable to CT or MRI.

In addition, laparoscopic ultrasound can be used to locate the site of the enlarged lymph node so that the dissection can be minimized.^{9,10} This is more helpful especially during dissection in laparoscopic surgery when the enlarged lymph node cannot be easily visualized by laparoscopy. The lymph nodes can then be removed for histological confirmation and the limited dissection may theoretically reduce the complications of radiotherapy.

CONCLUSION

In gynecological surgery, laparoscopic ultrasound can be used to compensate the limitations of laparoscopy in performing laparoscopic surgery. In the management of gynecological malignancy, laparoscopic ultrasound is found to be useful to identify lymph node involvement with size > 5 mm. This method may avoid combination treatment in cervical cancer and therefore may reduce the complications result from combination treatment.

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