

## Imaging Study of Bladder Wall Invasion by Endophytic Type Cervical Cancer (III): Stage I Bladder Wall Invasion on Ultrasound Classification

Wen-Chen Huang, M.D.<sup>1,2,3</sup>, Shwu-Huey Yang, Ph.D.<sup>4</sup>, Jenn-Ming Yang, M.D.<sup>2,5</sup>

Department of Obstetrics and Gynecology<sup>1</sup>, Cathay General Hospital, Taipei, Taiwan; School of Medicine<sup>2</sup>, Taipei Medical University, Taipei, Taiwan; School of Medicine<sup>3</sup>, Fu Jen Catholic University, Taipei, Taiwan; School of Nutrition and Health Sciences<sup>4</sup>, Taipei Medical University, Taipei, Taiwan; Division of Urogynecology<sup>5</sup>, Department of Obstetrics and Gynecology, Taipei Medical University Shuang Ho Hospital, Taipei, Taiwan; E-mail: yangjm0211@hotmail.com

### BRIEF HISTORY

An 81-year-old woman, gravida 7 para 7, presented to our gynecologic clinic with postmenopausal bleeding for three months.

### CLINICAL EXAMINATION

Pelvic examination identified an expanded cervix with a cauliflower-like necrotic surface which was infiltrating the anterior and posterior vaginal walls. Digital rectal examination revealed that the left parametrium was infiltrated by a tumor originating from the expanded cervix. Urinalysis revealed hematuria (41-50 red blood cells per high power field).

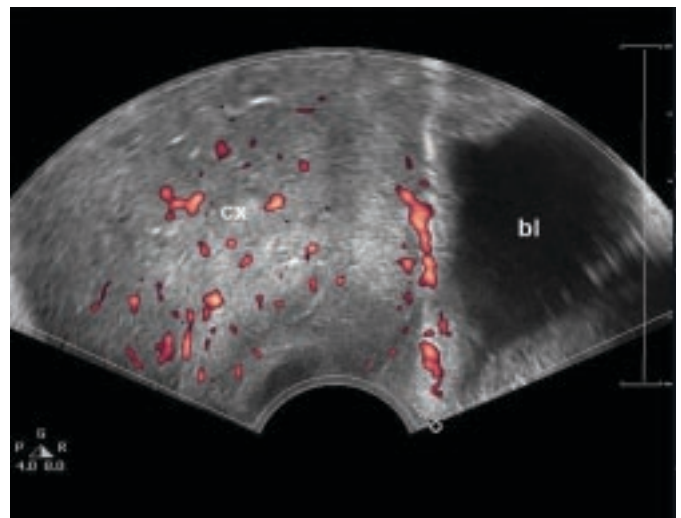
### IMAGING STUDY

Transvaginal ultrasound Doppler flow mapping demonstrated an expanded cervix, about 9 x 7 cm, with infiltration by a hypervascular tumor mass (Fig. 1). The echogenic boundary between the cervix and posterior bladder wall was generally intact except for one site (Fig. 2). Whole abdominal computerized tomography revealed a large mass lesion (about 9x8x7 cm) expanding the uterine cervix with involvement in the uterine corpus and left parametrium. The fat planes between the cervical mass and urinary bladder wall and rectal wall were intact (Fig. 3). Additionally, multiple enlarged lymph nodes were noted at the para-aortic region and left common, external, and internal iliac lymphatic chains.

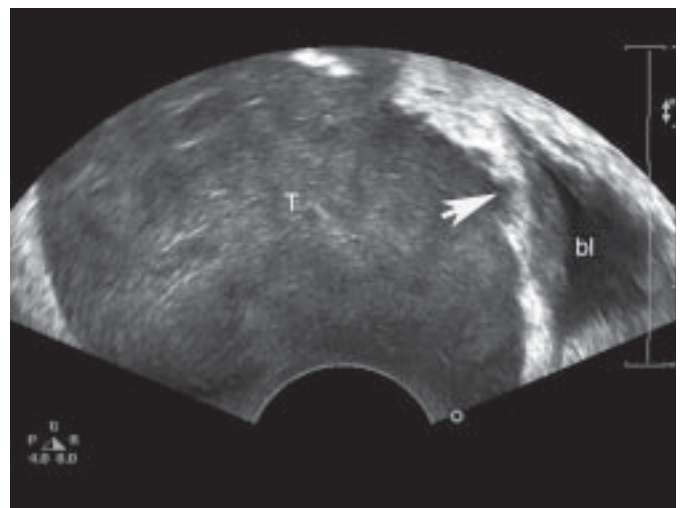
Cystoscopy did not reveal any abnormality of the bladder mucosa (Fig. 4). Proctosigmoidoscopy up to 60 cm did not reveal any abnormality. After cervical biopsy, histopathological examination proved squamous cell carcinoma with a keratinized and poorly-differentiated cell type. The level of squamous cell carcinoma related-antigen (SCC) was 19.90 ng/mL (normal value <2.50 ng/mL).

### MANAGEMENT

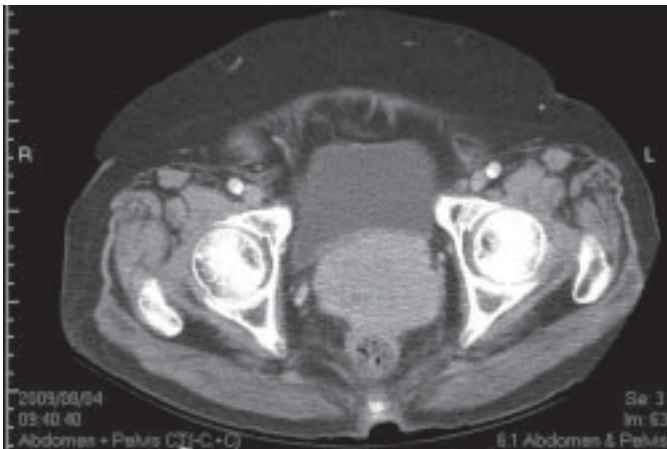
This patient was planned to undergo the treatment of concurrent chemoradiotherapy (weekly cisplatin at a dose of 40 mg/m<sup>2</sup> and external radiation administered in fractions of 1.8 Gy pr day on days 1 to 5 of each week, for a total of 28 fractions). Subsequent follow-ups were assessed by the determination of SCC, pelvic examination and transvaginal ultrasound.



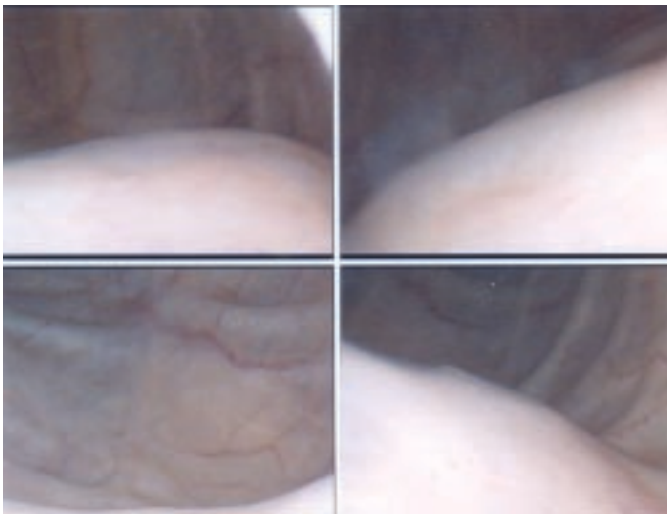
**Fig. 1.** Transvaginal Doppler flow mapping showing the cervix is infiltrated by a hypervascular tumor. (cx = cervix; bl = bladder)



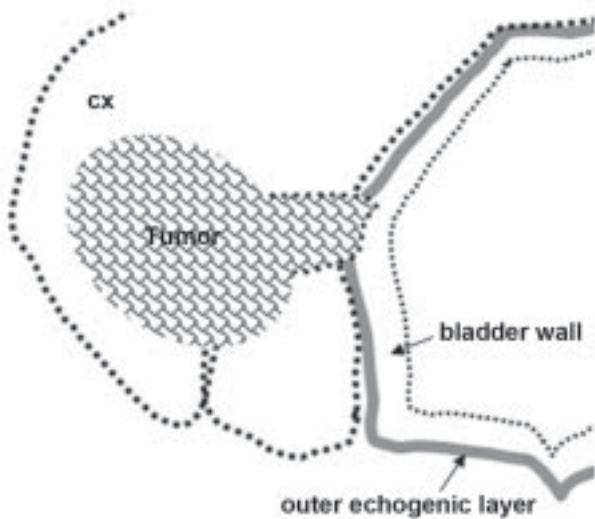
**Fig. 2.** Transvaginal ultrasound revealing the echogenic boundary between the cervix and posterior bladder wall is generally intact except for one site where the echogenic layer of the bladder wall is invaded by a tiny tumor protuberance (arrow). (T = tumor; bl = bladder)



**Fig. 3.** Abdominal CT demonstrating an intact interface between the bladder and cervix.



**Fig. 4.** No abnormal cystoscopic findings.



**Fig. 5.** Schematic diagram of stage I bladder wall invasion on ultrasound classification.

## COMMENTS

With the recent introduction of high-resolution vaginal probes, Doppler angiography, and the 3D scanning technique, serial changes in bladder wall infiltration can be clearly demonstrated on ultrasound [1]. Disruption of the endopelvic fascia without involvement of the inner bladder wall is the initial stage of bladder wall invasion (stage I bladder wall invasion on ultrasound classification) (Fig. 5). Therefore, cystoscopy would not reveal any abnormality of the bladder mucosa. When only the outer one-third to one-half of the inner bladder wall is penetrated (stage II), the bladder wall thickness increases, but the mucosa is still normal. Thus, cystoscopy still would not reveal any abnormalities. It is only when the tumor penetrates, further, reaching the inner half of the inner bladder wall (stage III), that abnormalities of the mucosa are visible cystoscopically, i.e., an irregular and elevated bladder mucosa, bullous edema, cystitis cystica, and telangiectasia. With complete tumor penetration, the inner bladder wall loses its normal architecture and texture and is replaced by invasive tumor (stage IV), which can easily be detected by cystoscopy [1,2].

## REFERENCES

1. Huang WC, Yang JM, Yang YC, Yang SH: Ultrasonographic characteristics and cystoscopic correlates of bladder wall invasion by endophytic cervical cancer. *Ultrasound Obstet Gynecol* 2006; **27**: 680-686.
2. Kim SH, Han MC: Invasion of the urinary bladder by uterine cervical carcinomas: Evaluation with MRI imaging. *AJR Am J Roentgenol* 1997; **168**:393-397.