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

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## BRIEF HISTORY

A 54-year-old postmenopausal woman, gravid 2, para 2, presented at our gynecology clinic due to postmenopausal bleeding. She denied any history of systemic medical diseases or previous surgeries. Her last period was at age of 50. There were no lower urinary tract or bowel symptoms.

## CLINICAL EXAMINATION

On pelvic examination, an eroded cervix with normal appearance of vaginal epithelium was inspected. Digital examination per vagina and rectum revealed bilateral parametrial spaces were free of tumors. Cervical biopsy was performed and pathological examination revealed invasive squamous cell carcinoma.

## IMAGING STUDIES

Two-dimensional (2D) ultrasound with color Doppler study in the sagittal view showed a tumor protuberance arising from the cervicouterine junction and adjoining the supratrigonal portion of bladder wall (Fig. 1A). Three-dimensional (3D) sagittal (Fig. 1B) and axial views (Fig. 1C) demonstrated the endopelvic fascia was interrupted by the tumor protuberance, extending furthermore into the outer one third of the inner bladder wall. The bladder wall thickness increased but the mucosa was still normal, compatible with stage II bladder wall invasion on ultrasound classification [1]. Power Doppler study revealed neovascular connections between the tumor protuberance and primary lesion (Fig. 1D).

Cystoscopic examination disclosed smooth surface of bladder mucosa over the supratrigonal region (Fig. 1E). Computed tomography (CT) scanning showed a protuberance between the cervix and bladder (Fig. 1F).

## COMMENT

Ultrasound clearly demonstrated bladder wall invasion in this patient. Concurrent chemoirradiation instead of surgical intervention was therefore recommended. Successful treatment for cervical cancer necessitates accurate clinical evaluation [2]. The diagnostic tools for clinical staging recommended by International Federation of Gynecology and Obstetrics (FIGO) include physical examination, radiological studies (intravenous pyelogram, barium enema, chest X-ray, and skeletal X-ray), and investigative procedures (such as colposcopy, cervical biopsy, conization, endocervical curettage, cystoscopy, and proctoscopy). Currently, the roles of CT, magnetic resonance imaging, and positron emission tomography in the clinical assessment of cervical cancer are merely optional. Patients in the early stages of the disease benefit from either radical hysterectomy or radiotherapy. However, if bladder wall involvement is not detected preoperatively and it is found during radical hysterectomy, surgery is usually either discontinued early or converted to an even more extensive operation than originally planned. This may delay postoperative chemoirradiation therapy or risk suffering from incidental cystotomy or vesicovaginal fistula [1].

Our experience of endophytic cervical tumors with bladder wall invasion demonstrates the limitations of conventional diagnostic tools [1]. With the recent introduction of high-resolution vaginal probes, Doppler angiography [3], and 3D scanning techniques [4], the serial changes in the bladder wall infiltrations can be clearly demonstrated on ultrasound. It seems that ultrasound will become a useful tool for patients with cervical cancer during the clinical staging process, while exploring tumor behavior, and when planning treatment.

## REFERENCES

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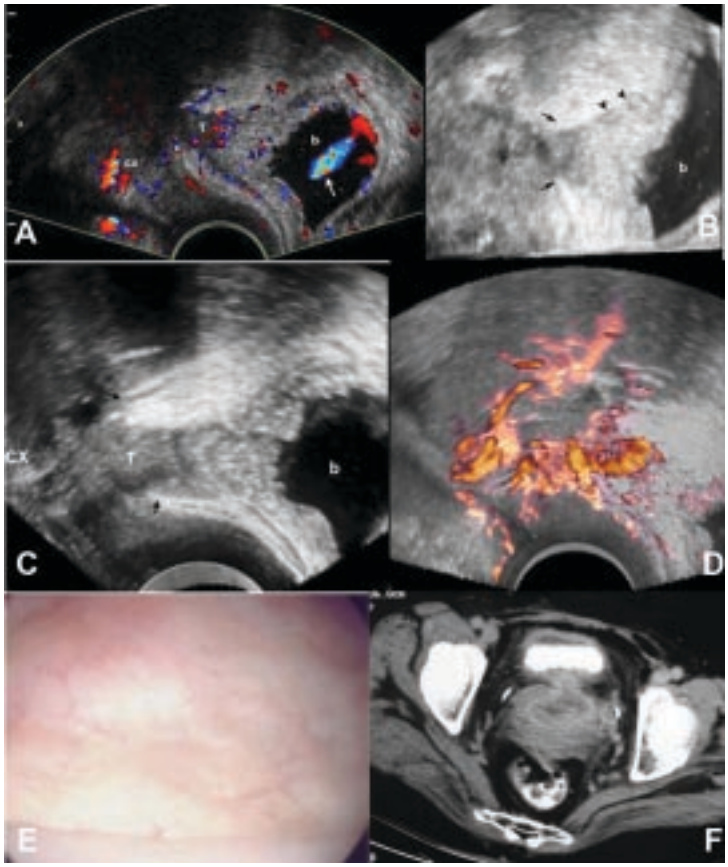


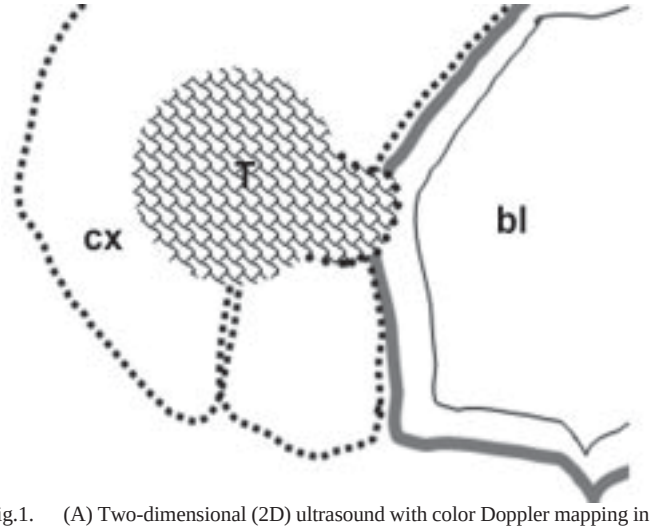


Fig.1. (A) Two-dimensional (2D) ultrasound with color Doppler mapping in the sagittal view showing a tumor protuberance (T) arising from the cervico-uterine junction and adjoining the supratrigonal portion of bladder wall. Ureter jet phenomenum (white arrow) displayed on color Doppler study indicates the location of ureter orifice. Three-dimensional (3D) imaging in the sagittal (B) and axial (C) views revealing the endopelvic fascia (black arrows) is interrupted by the tumor protuberance, which penetrates only to outer one third of the inner bladder wall (black arrowheads). (D) Power Doppler study demonstrating the association of the neovascularity between the tumor protuberance and primary lesion. (E) Cystoscopic examination revealing smooth surface of bladder mucosa over supratrigonal region. (F) Computed tomography scanning showing a protuberance between the cervix and bladder. (G) Schematic drawing demonstrating the extent of tumor invasion into the outer one third of the inner bladder wall. (cx: cervix; b: bladder; T: tumor protuberance)