

The Predictive Value of Advanced Transvaginal Sonography in Patients with Endometrial Neoplasia

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INTRODUCTION

In the field of Gynecologic Oncology, there is much debate in regards to which patients with Atypical Endometrial Hyperplasia (AEH) and Endometrial Carcinoma (EC) will require complete lymphadenectomy. Recent studies have shown that preoperative grade and tumor-size and intra-operative frozen sections (measuring depth-of-invasion, tumor size and grade) to be good predictors of nodal dissemination. The ability to use advanced transvaginal sonography (TVS) or transrectal sonography (TRS) techniques to identify features of this neoplastic entity preoperatively may help us predict the extent of the tumors invasion *before* surgery and better prepare for possible staging procedures and better preoperative counselling.

OBJECTIVES

All patients in this continuous ongoing investigation who were histologically diagnosed with AEH or EC were examined sonographically, using three-dimensional transvaginal sonography (3DTVS) with Power Doppler Angiography (PDA), and Virtual Organ Computer-Aided Analysis (VOCAL) system from April 1, 2015 to the present. All of these patients underwent a subsequent surgical procedure with the resulting histology surgically obtained to be compared with those pre-operative ultrasound findings.

U/S evaluation of deep myometrial invasion used endometrial thickness, tumor/uterine AP ratio, demonstrated in Fig. 1. (*Cut off: ≥ 0.50*).³

Tumor free minimal margin tumor distance to serosa (TDS), demonstrated in fig. 2.. (*Cut off < 9 mm*).⁴

Subjective U/S evaluation of cervical stromal invasion used the tumor extension into the endocervical canal and truly (no sliding) invading the cervical stroma. Assessment of vessels entering the tumor at the region of the internal cervical os, suggesting invasive growth demonstrated in Fig. 3.

For the Gray-scale and vascular morphology assessment, we used the one recommended by The International Endometrial Tumor analysis (IETA) group.⁵

The tumor volume was measured using VOCAL system, and the Vascularity Index (VI) used the histogram as demonstrated in Fig 4 .

RELEVANT IMAGES



Fig. 1 Endometrial cancer patient demonstrating uterus AP : 4.0 cm. (A) Tumor AP diameter (B) : 1.57 cm. B/ A ratio of 0.39 (*cut off = 0.5*)

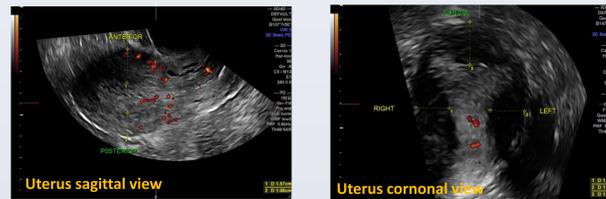


Fig. 2 Endometrial cancer patient demonstrating tumor free minimal margin tumor distance to serosa (TDS). Of the 5 measurements. The minimal tumor distance to de serosa = 10.8 mm (*cut off = 9 mm*).



Fig. 3 Suspected deep myometrial invasion and cervical stromal invasion because TDS < 9 mm (A) and vessels entering the tumor at the region of the internal cervical os (B). Pathology confirmed the U/S findings.

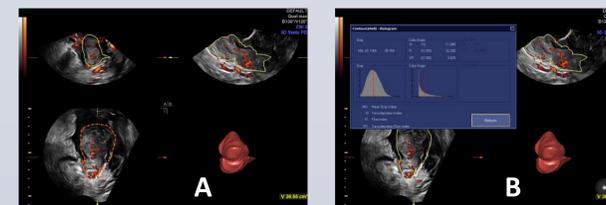
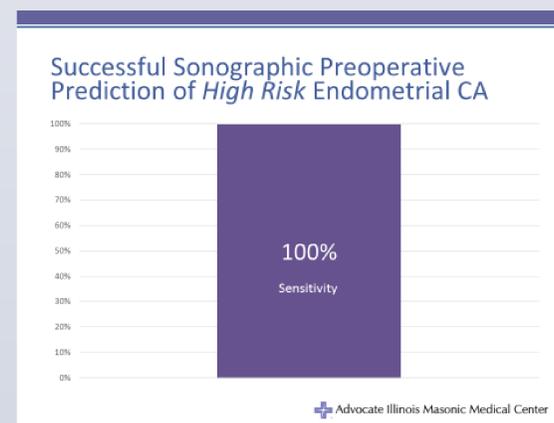


Fig. 4 Demonstrating the measurement of the tumor volume using the VOCAL system (A). Calculating the VI using the Histogram (B).

RESULTS

The identified sonographic features of the cases enrolled in this study were compared with the intraoperative and post-operative clinical and pathologic findings found. With the results of only 27 patients thus far, the ultrasound findings predicted the pathology staging reports with 100% sensitivity (and 67% specificity). Particular to this investigation, deep myometrial invasion ($\geq 50\%$) and cervical stromal invasion were specifically identified and which is naturally associated with more advanced FIGO surgical staging of endometrial carcinoma.



Optimal sensitivity is desired, so that the likelihood of missing High Risk EC is minimized.

CONCLUSIONS

The authors wish to disclose these results, so that other gynecologic specialists can see the clinical value of these described 3DTVS sonographic techniques. Our investigation has revealed the potential to predict surgical oncologic staging (\geq Stage IB) preoperatively using 3D U/S with PDA technology 100% of the time when used. The specificity was 78%.

This suggests that 3DTVS should be routinely used prior to surgical treatment for Endometrial Neoplasia.

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