COLOR DOPPLER TRANSVAGINAL ULTRASOUND FOR DETECTING INTRAUTERINE DISORDERS IN PATIENTS WITH ABNORMAL UTERINE BLEEDING

KOLOR DOPLER TRANSVAGINALNI ULTRAZVUK U OTKRIVANJU PROMJENA MATERIŠTA U BOLESNICI S ABNORMALNIM KRVARENJIMA MATERNICE

Angela Pascual, Betlem Graupera, Francisco Tresserra,* Alici Ubeda, Lourdes Hereter, Ignacio Rodriguez, Pedro J. Grases*

Key words: intrauterine pathology, abnormal uterine bleeding, color Doppler transvaginal ultrasonography, hysteroscopy

SUMMARY. Purpose. To evaluate the role of colour Doppler transvaginal ultrasonography (CDTU) in detection of intrauterine pathology in those patients with abnormal uterine bleeding. Material and methods. 272 patients with abnormal uterine bleeding were evaluated by color Doppler transvaginal ultrasonography searching for intrauterine pathology. All patients underwent hysteroscopic studies to evaluate ultrasonographic findings. Ultrasonographic variables considered were: endometrial thickness, gray-scale and color Doppler sonographic findings, resistence index and pulsatility index. Results. CDTU showed intrauterine abnormalities in 142 patients (52.2%) being the polyps (82 cases) and myomas (41 cases) the most frequent. Hysteroscopy revealed abnormalities in 149 women, 125 of them showing alterations in CDTU. The sensitivity is of 83.9% (CI: 76.8–89.2), the specificity of 86.2% (CI: 78.5–91.5), the predictive positive value of 88.0% (CI: 81.3–92.7) and the predictive negative value of 81.5% (CI: 73.6–87.6). The sensitivity of CDTU for the diagnosis of polyp was 72.8% (CI: 61.6–81.9) and for the diagnosis of myoma 85.7% (CI: 70.8–94.1). Conclusion. CDTU can be used to discriminate women with abnormal uterine bleeding that should undergone to hysteroscopy for a definitive diagnosis.

Introduction

Abnormal uterine bleeding (metrorrhagia or menorrhagia – AUB) is a frequent gynecologic symptom that can appear due to many etiologic causes, producing chronic anemia, but the most important is endometrial carcinoma. Thus makes that AUB yields to distress, and this pathology should be disclosed.

Color Doppler transvaginal ultrasonography (CDTU) of the endometrium has become an important part of the evaluation of women presenting AUB. It is noninvasive, low in cost procedure that does not cause patient discomfort.1 In patients with AUB ultrasound-based triage has become widely accepted.2–10 The aim of this study is to evaluate the diagnostic value of CDTU in the diagnosis of intrauterine pathologic disorders.

Material and methods

From 1st June 2003 to 15th September 2003 a prospective observational study was undertaken at the Gynecological Ultrasound Unit in 272 consecutive patients with AUB. Those pregnant patients were disclosed. All women were studied with color Doppler transvaginal ultrasonography and hysteroscopy. Sonographic examinations were done with real-time ultrasound scanner.
lum, cervical tentaculum or oral premedication are rou-

tingly used. Major indications gather abnormal uterine

bleeding, fertility disorders or abnormalities in imaging

techniques.

The gold standard was defined as the presence or ab-

sence of an endometrial abnormality at hysteroscopy

within 3 months after CDTU.

For statistical analysis percentages, mean and standard

deviations were used. Sensitivity, specificity, positive and

negative predictive value of CDTU for detecting intra-

uterine abnormalities were also calculated.

Results

The study group was composed by 272 patients com-

plaining dysfunctional uterine bleeding, having CDTU

and hysteroscopic examination.

The mean age of the patients was 44±10.6 year (23–

73), 59 being menopausal.

CDTU showed no pathologic alterations in 130 (47.8%)

patients (Table 1) whereas in 142 (52.2%) women re-

vealed intrauterine pathology such as polyps in 82 (57.7%),

myomas in 41 (28.9%), hypertrophy in 16 (11.1%), and

neoplasia in three (2.1%). Hysteroscopy was normal in

123 (45.2%) patients and abnormal in 149 (54.8%) whose

diagnosis were: polyps in 81 (54.4%), submucous myo-

mas in 42 (28.2%), hyperplasia in 21 (14.1%), synchiae

in four (2.7%) and neoplasia in one (0.7%). In 125 of

149 patients with hysteroscopic abnormalities CDTU
detected intrauterine alterations, being the sensitivity of

83.9% (CI: 76.8–89.2), the specificity of 86.2% (CI: 78.5–

91.5), the predictive positive value of 88.0% (CI: 81.3–

92.7) and the predictive negative value of 81.5% (CI:

73.6–87.6).

The sensitivity in diagnosis of polyt between CDTU

and hysteroscopy was of 72.8% (CI: 61.6–81.9; 59 of

81) with a specificity of 88.5% (CI: 82.3–92.1), predic-
tive positive value of 72.0% (CI: 60.8–81.0) and predic-
tive negative value of 88.4% (CI: 82.8–92.4). In the 23
cases with false positive diagnosis of polyt by CDTU,
hysteroscopy was normal in 12, hysteroscopy diagnosed
hyperplasia in nine, neoplasia in one and synchiae in one.
The sensitivity in the diagnosis of myoma (Fig. 1) was

of 85.7% (CI: 70.8–94.1; 36 of 42). In 5 cases with false
positive CDTU diagnosis of myoma, hysteroscopy was

normal in two and revealed a polyp in three patients.

The 59 polyps diagnosed by CDTU verified by hys-
teroscopy showed a mean size measured by ultrasound

Table 1. Relationship between diagnose by CDTU and hysteroscopy

<table>
<thead>
<tr>
<th>CDTU</th>
<th>Hysteroscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>Normal</td>
<td>106</td>
</tr>
<tr>
<td>Polyp</td>
<td>12</td>
</tr>
<tr>
<td>Myoma</td>
<td>2</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>2</td>
</tr>
<tr>
<td>Neoplasia</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
</tr>
</tbody>
</table>

Table 1. Odnos dijagnoza postavljenih kolor dopler transvagalnim ultrazvukom i histeroskopijom

Tablica 1. Odnos dijagnoza postavljenih kolor dopler transvagalnim ultrazvukom i histeroskopijom
of 13.0±7.9 mm (ranging from 5 to 64 mm). Twenty six (44%) of these cases showed flow on color Doppler (Fig 2), with a mean pulsatility index of 1.29±0.93 and a mean resistance index of 0.64±0.11.

CDTU was not useful in diagnosis of neoplasia thus the three patients diagnosed showed respectively a polyp, hyperplasia and normal cavity by hysteroscopy.

**Discussion**

In addition to endometrial carcinoma there are several causes of AUB and many of them can be detected by CDTU such as the pathology related to pregnancy as is the ectopic pregnancy. CDTU is also an efficiency procedure to detect endometrial polyps, the most frequent pathology found in those patients with AUB. Ultrasonographic diagnosis of polyp can be done mainly when the vascular pedicle is demonstrated by high resolution color Doppler.11 The use of more sensitive color Doppler like a power Doppler12 or power Doppler three-dimensional ultrasound13 will probably improve the visualization of vascular pedicle in endometrial polyps. Endometrial polyp also can be differentiated from submucosal myoma according the vascularization pattern.14 Some authors15 suggest that CDTU can detect malignancy in endometrial polyps but others found that nor flow impedancy (pulsatility index and resistance index) neither lesion size can predict malignancy.16 Even hysteroscopy and saline contrast sonohysterography cannot reliably differentiate atypical from benign endometrial polyps,17 our results show that CDTU is useful in the diagnosis of endometrial polyps. Only in 11 patients CDTU was normal and hysteroscopy revealed the presence of a polyp.

In patients with abnormal uterine bleeding it has been shown that endometrial thickness as measured with transvaginal sonography has a high sensitivity but a poor specificity.7 Saline contrast sonohysterography is accurate in the evaluation of the uterine cavity in pre- and post-menopausal women with abnormal uterine bleeding.18

The cost of saline contrast is higher than transvaginal sonography, it needs extra time to counsel the patient, prepare the material and perform the procedure. Side effects include pelvic pain, vasovagal symptoms, nausea and vomiting, infection, although very rare, and dissemination of malignant cells in the peritoneal cavity.19,20 Physicians who perform or supervise diagnostic saline infusion sonohysterography should have training, experience, and demonstrated competence in gynecologic ultrasonography and saline infusion sonohysterography.21

The highest accuracy of hysteroscopy was reported in diagnosing endometrial polyps, whereas the worst result was in estimating hyperplasia. Therefore, since the incidence of focal lesions in patients with abnormal uterine bleeding is high, it seems that the most beneficial approach is to proceed with hysteroscopy complemented by endometrial biopsy.22

Our results, mainly in the diagnosis of intracavitary myomas show a good concordance between CDTU and hysteroscopy. Farquhar et al.23 in his revision concluded that ultrasonography, sonohysterography and hysteroscopy were moderately accurate in detecting intrauterine pathology, but sonohysterography and hysteroscopy performed better than transvaginal ultrasound in detecting
submucous myomas. Other authors\textsuperscript{24} found that differential diagnosis for abnormal uterine bleeding in premenopausal and postmenopausal patients is well evaluated with ultrasound, and ultrasound techniques have greatly facilitated evaluation of pelvic disease.

The scanty cases of endometrial cancer makes that CDTU shows a low diagnostic efficiency in our serie compared with.\textsuperscript{2,3,6,7,26}

According to our results CDTU, although is an operator dependent technique, has a good capacity to detect intrauterine pathology. Some authors have demonstrated that many of the discordances can be due to the interobserver variability, perhaps some strategies to avoid this problem should be taken.\textsuperscript{25} In this way 3D ultrasonography can play an important role in the future.\textsuperscript{13}

Even the discordances CDTU can provide information about the texture of endometrium, so that one can distinguish bleeding due to endometrial hyperplasia, polyps or myomas. CDTU can thus be used to distinguish those patients that may be followed from those in whom ultrasound detected findings makes that hysteroscopy and/or biopsy is required. In conclusion our data show that CDTU can be used to select women with abnormal uterine bleeding who would further benefit from the use of hysteroscopy to make a definite diagnosis.

\textbf{Acknowledgement.} The authors are grateful to the Cat-
edra d’Investigació en Obstetricia i Ginecologia (Universitat Autònoma de Barcelona) for its support.

\textbf{References}


11. Timmerman D, Verguts J, Konstantinovic L, et al. The pedi-

12. Alcazar JL, Castillo G, Mingeza JA, Galan MJ. Endome-
trial blood flow mapping using transvaginal power Doppler sonogra-
phy in women with postmenopausal bleeding thickened endo-


14. Fleischer AC, Shappell HW. Color Doppler sonohysterogra-
phy of endometrial polyps and submucosal fibroids. J Ultra-


17. Epstein E, Ramirez A, Skoog L, Valentin T. Transvaginal sonography, saline contrast sonohysterography and hysteroscopy for the investigation of women with postmenopausal bleeding and endo-

18. De Kroon CD, de Bock G, Dieben SW, Janssen FW. Saline contrast hysterosonography in abnormal uterine bleeding: a system-
tic review and meta-analysis. BJOG 2003;110:938–47.

19. Dessole D, Farina M, Rubattu G et al. Side effects and complica-
tions of sonohysterosalpingography. Fertil Steril 2003;80:
620–4.

20. Alcazar JL, Errasti T, Zornoza A. Saline infusion sonohys-

21. Breitkopf D, Goldstein SR, Seeds JW. ACOG Comittee on Gynecologic Practice. ACOG technology assessment in obstet-

22. Revel A, Shushan A. Investigation of the infertile couple: hysteroscopy with endometrial biopsy is the gold standard investi-


24. Williams PL, Laifer-Narin SL, Ragavendra N. US of ab-

25. Dueholm M, Lundorf E, Sorensen JS et al. Reproducibility of evaluation of the uterus by transvaginal sonography, hyster-


\textit{Address for correspondence:} Angela Pascual, MD, PhD, Paseo de la Bonanova 69, 08017 Barcelona, Spain, e-mail: marpas@de-
xeus.com