Transvaginal Ultrasonography, Sonohysterography and Hysteroscopy for Intrauterine Pathology in Patients with Abnormal Uterine Bleeding

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Objectives: *To test the diagnostic accuracy of sonohysterography and hysteroscopy in detection of endometrial polyps and submucous myomas.*

Material and Method: *Retrospective review of the fifty six records of the patients with abnormal uterine bleeding who had positive sonohysterography and underwent operative hysteroscopy performed between June 2001 and December 2004. Exclusion of six patients with incomplete records, giving a total of fifty records included in the present study, using pathological reports as a gold standard.*

Results: *The two most common pathologies were 58% of endometrial polyps and 42% of submucous myomas. The sensitivity, specificity, positive predictive values, negative predictive values and accuracy for diagnosis of endometrial polyps by sonohysterography were 92.59%,72.73%, 80.65%, 88.89% and 83.67% and by hysteroscopy were 93.10%, 84.0%, 87.10%, 91.30% and 88.89% for submucous myomas by sonohysterography were 88.89%, 93.55%, 88.89%, 93.55% and 91.84% by hysteroscope were 90.91%, 87.50%, 83.33%, 93.33% and 88.89% respectively.*

Conclusion: *The diagnostic accuracy for endometrial polyps and submucous myomas by sonohysterography are equal to hysteroscopy.*

Keywords: *Transvaginal ultrasonography, Sonohysterography, Hysteroscopy, Uterine pathology, Abnormal uterine bleeding*

J Med Assoc Thai 2005; 88(Suppl 3): S77-81
Full text. e-Journal: *http://www.medassocthai.org/journal*

Abnormal uterine bleeding (AUB) is a common outpatient gynecologic consultation[1]. The main principle of management is to exclude endometrial malignancy and correctly identify the causes. Transvaginal ultrasonography (TVS) can detect pelvic lesions that were not evident on pelvic examination. TVS can measure endometrium thickness, show echogenicity and suggest endometrial lesion but the exact location of the lesion is sometimes difficult to localize. Sonohysterography (SHG) provides more detail on endometrial lining and more accurate location of the intraluminal lesion[2-4]. Non-directed office biopsy alone without imaging would have potentially missed the diagnosis of focal lesions such as polyps, submucous myomas and focal hyperplasia in up to 18%[5]. SHG combined with endometrial biopsy increases diagnostic accuracy[6]. Hysteroscopy has proved to be a more reliable method in evaluation of the endometrium[7]. Conventional TVS alone does not appear to be a screening procedure of sufficient diagnostic value in patients with abnormal uterine bleeding[8]. Accurate preoperative diagnosis and localization of intrauterine pathology helps the surgeon to choose the proper operation.

The objective of the present study was to review the results and test the diagnostic accuracy of SHG and hysteroscopy in detection of endometrial polyps and submucous myomas in patients with abnormal uterine bleeding, using pathological reports from operative hysteroscopy as a gold standard.

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Material and Method

Fifty six records of the patients with abnormal uterine bleeding who had positive sonohysterography and underwent operative hysteroscopy performed by the author at Phramongkutklao Hospital (20 patients) and Vichaiyut Hospital (36 patients) between June 2001 and December 2004 were retrospectively reviewed.

The patients with abnormal uterine bleeding had pelvic exam at first visit and had conventional TVS performed by the author on the same day for postmenopause or during proliferative phase for premenopause patients. If there was no pathology, the patients were managed as dysfunctional uterine bleeding and were not included in the present study. If an endometrial lesion was diagnosed or suspected by TVS, SHG was subsequently done. If there was no pathology, the patients were not included in the study but if focal pathology was identified by SHG, the patients were scheduled for operative hysteroscopy in the next cycle, a few days after menstruation had completely stopped. For a large submucous myoma, 3 dosages of gonadotropin releasing hormone agonist (GnRHa) were injected to reduce the size. After complete diagnostic hysteroscopy, endometrial polyp or submucous myoma was resected but for the patient in whom adenocarcinoma was suspected, only tissue biopsy was performed. The tissue was removed and sent for pathologic study. The pathological reports were used as the gold standard.

Technique

Conventional TVS was performed, using 6.5 mHz intravaginal probe to identify pelvic pathology. The uterus was scanned in both sagittal and coronal view and from internal os to the fundus.

SHG was done after complete ultrasound evaluation. The bivalve speculum was inserted. The cervix and vagina were cleaned by Betadine solution then an intrauterine insemination catheter filled with normal saline (NSS) was inserted through the cervical canal into the uterine cavity. The uterus was visualized and 5 -15 ml of NSS was slowly injected into the endometrial cavity. The intraluminal pathology was identified and recorded with thermal printer. If pregnancy or pelvic infection was suspected, the procedure was cancelled.

Diagnostic criteria

For conventional TVS and SHG:

Double layer endometrium thickness in mid sagittal view > 12 mm in premenopause or > 5 mm in postmenopause were classified as having intrauterine pathology. An irregular thickened endometrium with heterogeneous echo was also classified as abnormal. The homogeneous smooth margin hyperechoic mass without disruption of endometrial-myometrial interface was classified as endometrial polyp. The heterogeneous echoic mass protruding into the uterine cavity was classified as submucous myoma. Lack of distensibility of the endometrial canal was classified as endometrial carcinoma[9].

For hysteroscopy:

The endometrium was classified as abnormal if it appeared to be excessively thick, irregular and hypervascular with widened glandular openings. A smooth, firm and poorly vascularized tumor with similar color to the surrounding endometrium was classified as an endometrial polyp. A smooth, irregular shaped, sessile or pedunculated pale color tumor that distorted the regular contour of a normal uterine cavity was classified as a submucous myoma. A vegetative and necrotic, friable and hyper-vascularization mass with easy bleeding was classified as endometrial carcinoma[9].

The present study was approved by the ethical committee at Phramongkutklao Hospital.

Statistical analysis

The sensitivity, specificity, positive predictive values (PPV), negative predictive values (NPV) and accuracy were calculated for SHG and hysteroscopy with the presence of at least one polyp or one submucous myoma used as respective endpoints, and for abnormalities detected by histology.

Results

Three patients had no pathological report, three patients had incomplete records, fifty (89.29%) records were included in the present study. The mean age was 38 years with a range of 26 to 65 years. Thirty eight (76.0%) patients were nullipara and 12 (24.0%) patients were multipara. The indications for operative hysteroscopy were hypermenorrhea in 23 (46%) patients, metrorrhagia in 11 (22%) patients, menometrorrhagia in 9 (18%) patients, postmenopausal bleeding in 4 (8%) patients and bleeding during hormone replacement therapy (HRT) in 3 (6%) patients.

Forty nine (98.0%) patients were confirmed as having endometrial pathologies, only one (2.0%) patient had secretory phase endometrium. This patient

was misdiagnosed as endometrial polyp by all methods. One patient, who had histologic diagnosis as adenomyosis, was misdiagnosed as polyp by TVS and hysteroscopy but as myoma by SHG. Hysteroscopic diagnosis of having both polyp and myoma was made in five patients, the histology showed only polyp in 3 patients, only myoma in one patient and both polyp and myoma in one patient. Histologic diagnosis as both polyp and myoma was made in 3 patients, all three methods diagnosed as myoma in two patients and in another patient, TVS and SHG were diagnosed as polyp but hysteroscope as both polyp and myoma. Adenocarcinoma could be diagnosed by all methods.

Table 1 shows the results of the 50 tissue pathologies examined. The diagnoses of polyps, myomas, combined polyps and myomas, secretory phase endometrium, adenocarcinoma and adenomyosis were 26 (52.0%), 18 (36.0%), 3 (6.0%), 1 (2.0%), 1 (2.0%) and 1 (2.0%) patient(s) respectively. Endometrial polyps were confirmed by pathology in 26 patients. Endometrial polyps were diagnosed by TVS, SHG and hysteroscopy in 41 (82%), 31 (62%) and 26 (52%) patients but myomas were diagnosed by TVS, SHG and hysteroscopy in 8 (16%), 18 (36%) and 18 (36%) patients, respectively.

The sensitivity, specificity, PPV, NPV and accuracy of SHG and hysteroscopy for endometrial polyps and submucous myomas are demonstrated in Table 2.

Discussion

Almost all of the patients have intrauterine

Table 1. Endometrial pathologies from transvaginal ultrasonography, sonohysterography, hysteroscopy and tissue pathology

	Transvaginal ultrasonography	Sonohysterography	Hysteroscopy	Pathology
Polyps	**41** (82.0)	**31** (62.0)	**26** (52.0)	**26** (52.0)
Myoma uteri	**8** (16.0)	**18** (36.0)	**18** (36.0)	**18** (36.0)
Polyp & Myoma	**0**	**0**	**5** (10.0)	**3** (6.0)
Secretory phase endometrium	**0**	**0**	**0**	**1** (2.0)
Adenocarcinoma	**1** (2.0)	**1** (2.0)	**1** (2.0)	**1** (2.0)
Adenomyosis	**0**	**0**	**0**	**1** (2.0)
Total	**50** (100)	**50** (100)	**50** (100)	**50** (100)

The value in parenthesis is in percent

Table 2. Diagnostic test of transvaginal ultrasonography, sonohysterography and hysteroscopy for endometrial polyps and submucous myomas

	SHG				Hyteroscopy *			
	Polyps		Myomas		Polyps		Myomas	
	+	-	+	-	+	-	+	-
Patho +	25	2	16	2	27	2	20	2
Patho -	6	16	2	29	4	21	4	28
Total	31	18	18	31	31	23	24	30
Sensitivity(%)	92.59		88.89		93.10		90.91	
Specificity(%)	72.73		93.55		84.00		87.50	
PPV(%)	80.65		88.89		87.10		83.33	
NPV(%)	88.89		93.55		91.30		93.33	
Accuracy(%)	83.67		91.84		88.89		88.89	

* Hysteroscopic diagnosis as both polyp and myoma was made in 5 patients, pathology showed only polyp in 3 patients, only myoma in 1 patient and both polyp and myoma in 1 patient

pathologies, which were confirmed by histopathology. Endometrial polyps and submucous myomas were the two most common pathological findings in the present study (58% and 42% respectively). The final results show that the diagnostic accuracy for endometrial polyps and submucous myomas by sonohysterography are equal to hysteroscopy.

Sonohysterography is a valuable, minimally invasive sonographic technique, which enhances the visualization of endometrium and increases the diagnostic accuracy of TVS to that of diagnostic hysteroscopy[9]. The results from the present study are supported by a study by Bernard et al, which concluded that SHG is accurate in the diagnosis of endometrial polyps and submucous myomas[10].

Krampl E et al[11] reported that hysteroscopy yielded no additional information than was obtained at outpatient sonohysterography[11]. In addition, the combination of endometrial biopsy and saline contrast SHG has a high sensitivity and specificity in the detection of the cause of abnormal uterine bleeding[12].

In the present study, one patient had secretory phase endometrium. The thick endometrium during secretory phase could be easily confused with endometrial polyps. Hence, performing the investigations must be done only in the proliferative phase, especially in the reproductive age patients.

Schwarzler et al[9] studied pre and post menopause patients who had abnormal uterine bleeding, 48% had endometrial polyps and 33% had submucous myoma. Combined pathologies was underdiagnosed by TVS and SHG but overdiagnosed by hysteroscopy. Only one adenomyosis, which was misdiagnosed as myoma uteri, was found in the present study. One patient had adenocarcinoma, which could be diagnosed by all methods.

The accurate, less invasive, easy and cheap investigation which can be done at an out patient clinic should be considered to be the investigation of choice for the patients with abnormal uterine bleeding. The patient who has no pathology, hormonal treatment is usually appropriated but for the patient who has intrauterine pathology operation is considered. Accurate preoperative diagnosis of intrauterine pathology helps the surgeon to choose the proper operative procedure and preoperative patient preparation. Operation should be performed when indicated only and a less invasive procedure is preferred for preservation of reproductive function.

If TVS and SHG demonstrate intrauterine pathology, operative hysteroscopy is recommended. The results from SHG are comparable to hysteroscopy but SHG is simpler, cheaper and can be performed in outpatient clinics. SHG could be considered instead of hysteroscopy in selected cases.

A limitation of the present study was the small sample size and retrospective study, 6 (10.71%) records had to be excluded and all of the procedures were performed by only the author.

Acknowledgement

The author wishes to thank Dr. Pibool Leelapattana at Vichaiyut Hospital for his kind support and Dr. Artit Nakakes at Phramongkutklao Hospital for reading this paper before being published.

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การตรวจหาพยาธิสภาพในโพรงมดลูกในผู้ป่วยที่มีประจำเดือนผิดปกติ ด้วยคลื่นเสียงความถี่สูงผ่านช่องคลอด การฉีดน้ำเกลือเข้าโพรงมดลูกร่วมกับการตรวจคลื่นเสียงความถี่สูง และการใช้กล้องส่องโพรงมดลูก

วันเพ็ญ วงศ์แสวง

วัตถุประสงค์: *เพื่อทดสอบความแม่นยำในการวินิจฉัย ติ่งเนื้อของเยื่อบุโพรงมดลูก และเนื้องอกกล้ามเนื้อมดลูก จากการตรวจโดยการฉีดน้ำเกลือเข้าโพรงมดลูกร่วมกับการตรวจคลื่นเสียงความถี่สูง (sonohysterography, SHG) และการใช้กล้องส่องโพรงมดลูก*

วัสดุและวิธีการ: *การศึกษาครั้งนี้เป็นการศึกษาย้อนหลังจากเวชระเบียนผู้ป่วย ที่มีประจำเดือนผิดปกติ และตรวจพบพยาธิสภาพในโพรงมดลูกจากการฉีดน้ำเกลือเข้าโพรงมดลูกร่วมกับการตรวจคลื่นเสียงความถี่สูงผ่านทางช่องคลอด (sonohysterography, SHG) และได้รับการส่องตรวจและผ่าตัดด้วยกล้องส่องตรวจโพรงมดลูก ระหว่าง มิถุนายน พ.ศ. 2544 ถึง ธันวาคม พ.ศ. 2547 จำนวน 56 ราย เปรียบเทียบผลการวินิจฉัยกับผลการตรวจชิ้นเนื้อจากการผ่าตัด*

ผลการศึกษา: *ผู้ป่วย 6 รายมีข้อมูลไม่สมบูรณ์ ดังนั้นคงเหลือเวชระเบียนที่นำมาศึกษาจำนวน 50 ราย พยาธิสภาพที่พบบ่อยได้แก่ ติ่งเนื้อของเยื่อบุโพรงมดลูก (58%) และเนื้องอกกล้ามเนื้อมดลูก (42%) ความแม่นยำในการวินิจฉัยเมื่อเปรียบเทียบกับผลการตรวจชิ้นเนื้อพบว่า sensitivity, specificity, positive predictive values, negative predictive values และ accuracy สำหรับการวินิจฉัยติ่งเนื้อของเยื่อบุโพรงมดลูก โดย SHG เป็น 92.59%, 72.73%, 80.65%, 88.89% และ 83.67% โดยการใช้กล้องส่องโพรงมดลูก เป็น 93.10%, 84.0%, 87.10%, 91.30% และ 88.89% สำหรับการวินิจฉัยเนื้องอกกล้ามเนื้อมดลูกโดย SHG เป็น 88.89%, 93.55%, 88.89%, 93.55% และ 91.84% และโดยการใช้กล้องส่องโพรงมดลูกเป็น 90.91%, 87.50%, 83.33%, 93.33% และ 88.89% ตามลำดับ*

สรุป: *ความแม่นยำของการวินิจฉัยว่าเป็นติ่งเนื้อของเยื่อบุโพรงมดลูก และเนื้องอกกล้ามเนื้อมดลูกโดยวิธี SHG ใกล้เคียงกับการใช้กล้องส่องโพรงมดลูก*