

Ultrasound in the Evaluation of Abnormal Uterine Bleeding

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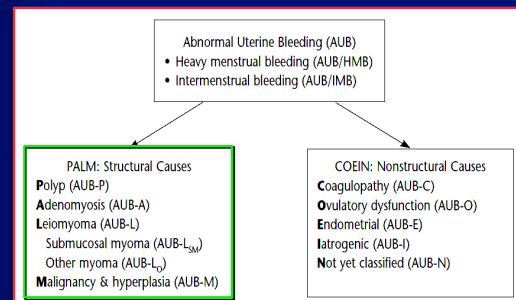
James M. Shwayder, M.D., J.D.

Disclosures: None

Learning Objectives

- Understand the relative value of different methods of evaluating the endometrium in patients with abnormal uterine bleeding
- Be able to better predict the presence of significant pathology in different age groups
- Be able to describe the unique capabilities of ultrasound
- Take home pearls in the evaluation of AUB with ultrasound

PALM-COEIN



ACOG Practice Bulletin. Diagnosis of Abnormal Uterine Bleeding in Reproductive-Aged Women. Number 128, July 2012

Endometrial Evaluation Histologic Evaluation

- **Options**
 - Endometrial biopsy
 - Dilatation and curettage
- **Diagnosis best made by tissue biopsy**
 - Hormonal dysregulation
 - Endometritis
 - Endometrial hyperplasia
 - Diffuse malignancy

Endometrial Evaluation Visual Evaluation

- **Options**
 - Hysteroscopy
 - Transvaginal sonography (TVS)
 - Saline-infusion sonohysterography (SIS)
 - 3D Ultrasound/SIS
- **Diagnosis best made by visualizing the endometrial cavity for focal anatomic causes**
 - Polyps
 - Submucous myomas
 - Focal malignancy

Does age affect the likelihood that the cause of AUB is amenable to a sonographic diagnosis?

Age-Based Findings at Hysteroscopy

Age Group (#)		Normal		Abnormal	
		%	#	%	#
≤ 29	14	64%	9	36%	5
30-39	58	45%	36	55%	22
40-49	105	42%	44	58%	61
50-59	43	28%	12	76%	31
> 60	18	33%	6	67%	12
Total	238	45%	107	55%	131

Indman PD, J Reprod Med 1995; 40: 545-548

Age-Based Findings at SIS (filling defects)

Age	(#)	Normal		Abnormal	
		%	#	%	#
≤ 29	38	68.4%	26	31.6%	12
30-39	80	62.5%	50	37.5%	30
40-49	152	68.4%	104	31.6%	48
50-59	43	60.4%	26	39.6%	17
> 60	28	60.7%	17	39.3%	11
Total	341	65.4%	223	34.6%	118

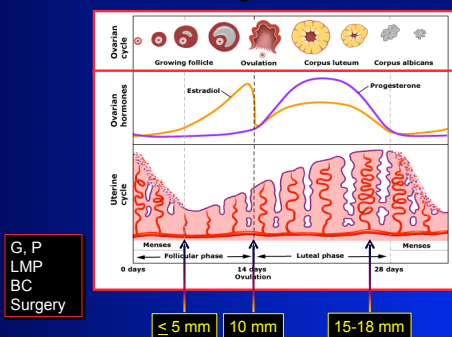
Brown and Shwayder, AIUM Annual Meeting 2007

Age-Based Findings at Surgery (filling defects)

Age	(#)	Normal		Abnormal	
		%	#	%	#
≤ 29	38	73.7%	28	26.3%	10
30-39	80	67.5%	54	32.5%	26
40-49	152	70.4%	107	29.6%	45
50-59	43	67.4%	29	32.6%	14
> 60	28	64.3%	18	35.7%	10
Total	341	69.2%	236	30.8%	105

Brown and Shwayder, AIUM Annual Meeting 2007

Timing of Studies



13 y.o. GO with AUB

- Began menses age 11
- Heavy bleeding x 10 months
- hCG = negative

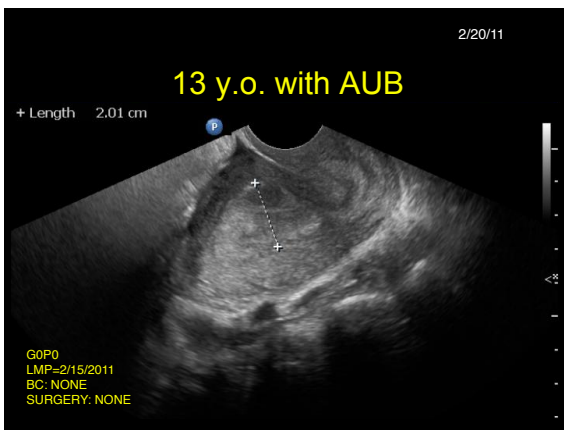
Adolescent Females

- “Immature” pituitary-hypothalamic axis
 - First 2 - 3 years following menarche
- Coagulation Disorders
 - 19% of adolescent patients with AUB
 - 25% if initial Hb < 10 gm/dL
 - 50% if hospitalization required

Claessens and Cowell, Am J Obstet Gynecol 1981; 139: 277-280

13 y.o. G0 with AUB

- Coagulation evaluation: WNL
- Minimal response to oral contraceptives
- hCG = negative
- Referred for ultrasound

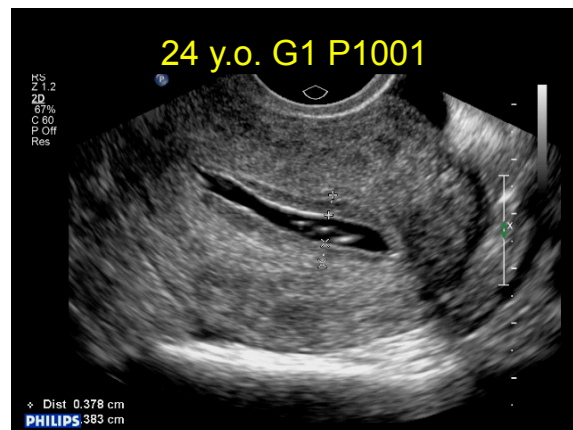
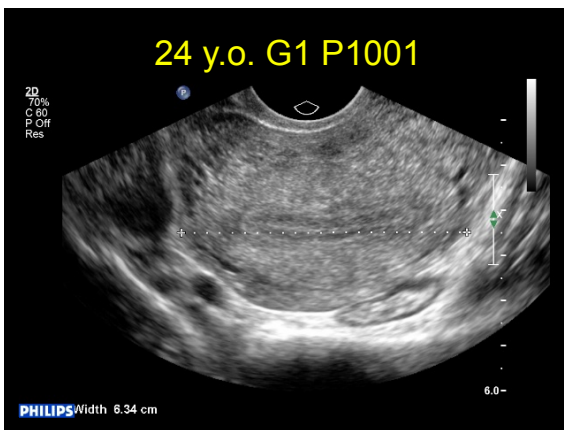
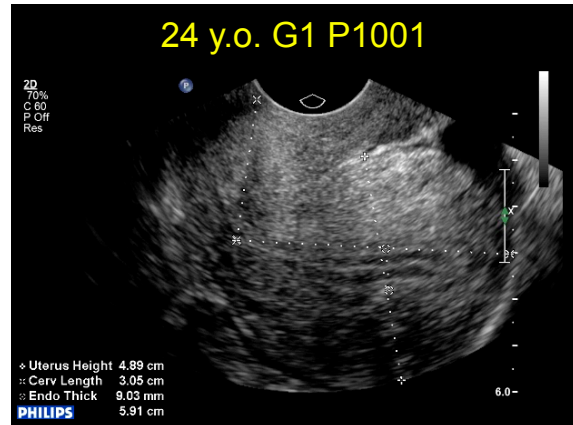


Advantage

- Preop diagnosis
- Preparation for surgery
 - Appropriate equipment
 - Preop medications

24 y.o. G1 P1001

- Presents with irregular, heavy bleeding for 8 months
- Delivered 1 year previously
- Breast fed x 2 months
- On oral contraceptives before pregnancy
- hCG: negative



24 y.o. G1 P1001

Additional history

- Finds bruises on her thighs frequently
- Has bloody noses ~ 2 x a month
- Her mother had a hysterectomy for heavy bleeding

Pathogenesis of AUB

Coagulopathies – Who to Evaluate?

History of 2 or more of the following:

- Bruising of > 5 cm 1-2 times/month
- Epistaxis 1-2 times per month
- Frequent gum bleeding with flossing or brushing teeth
- Family history of bleeding symptoms

Kouides et al. Fertil Steril 2005; 84: 1345-51.

The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

COMMITTEE OPINION

Number 580 • December 2013 (Replaces No. 451, December 2009)

Von Willebrand Disease in Women

- Heavy menstrual bleeding since menarche
- One of the following conditions:
 - Postpartum hemorrhage
 - Surgery-related bleeding
 - Bleeding associated with dental work
- Two or more of the following conditions:
 - Epistaxis, 1 to 2 times per month
 - Frequent gum bleeding
 - Family history of bleeding symptoms

Age and Menorrhagia

- 115 women with menorrhagia
- Age 35.4 ± 11.9 years (13-53)
- Age

	#	%
• < 19	25	21.8%
• 20-44	65	56.5%
• > 45	25	21.7%

Philipp et al. Obstet Gynecol 2005;105:61-66.

Age and Menorrhagia

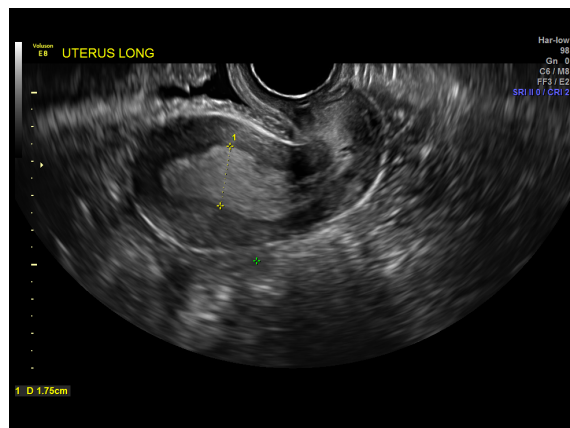
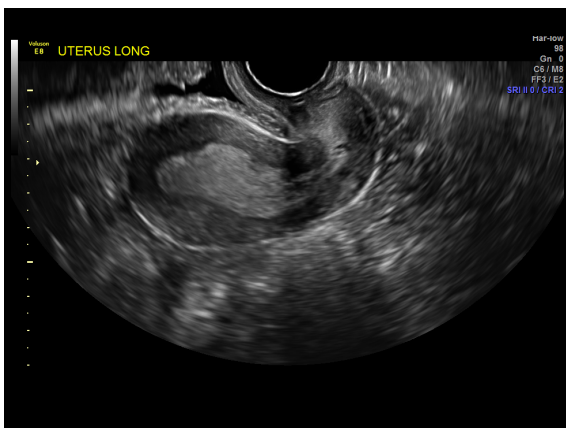
Abnormality	Total	≤ 19	20-44	≥ 45	p
Platelet aggregation	44	44	48	32	.48
Von Willebrand's factor	7	4	8	8	.78
Coagulation factor	5	8	6	0	.34
Any abnormality	47	48	52	32	.32

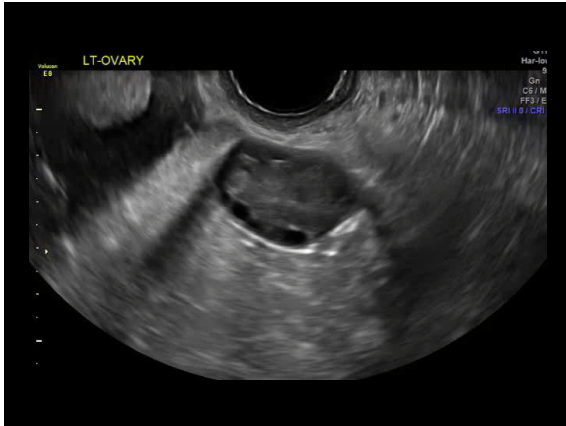
Values are percentages

Philipp et al. Obstet Gynecol 2005;105:61-66.

28 y.o. - Menometrorrhagia

- LMP = 9/01/15 (Study on 9/08/15)
- BC: Pills
- Surgery: None
- BMI = 69





Pathology

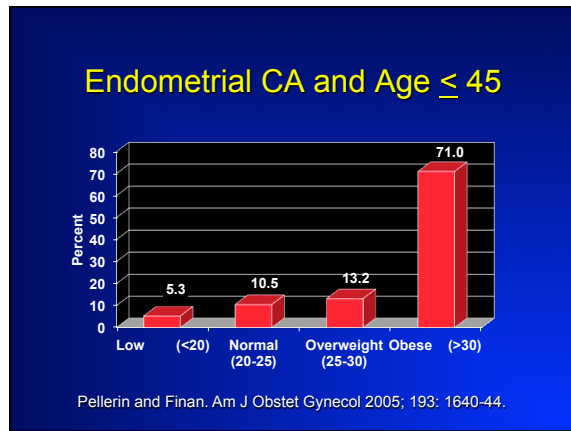
ENDOMETRIUM, BIOPSY:

- Simple glandular hyperplasia without cytologic atypia.

PCO and Endometrial Cancer

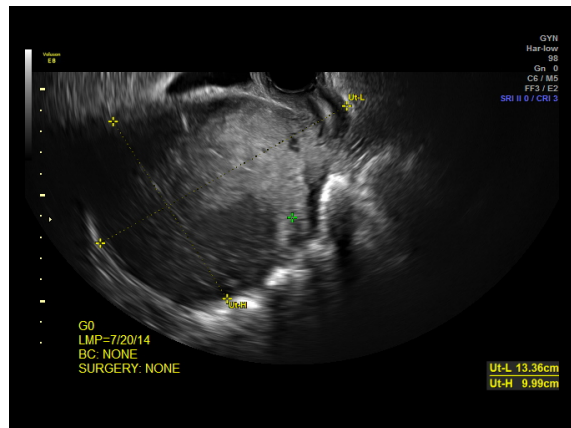
- Chronic anovulation
 - RR = 3.1 (1.1 – 7.3)¹
- Obesity
 - RR = 2.6 to 3.0²

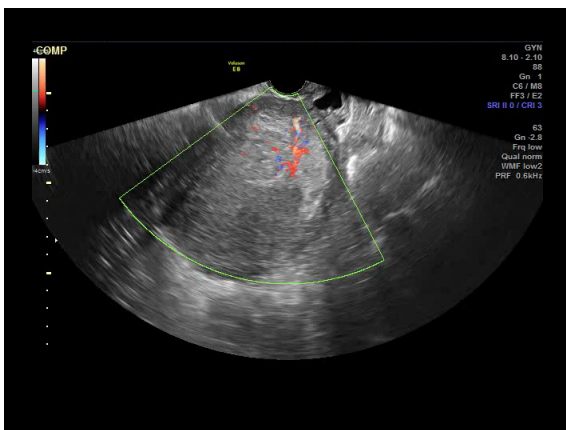
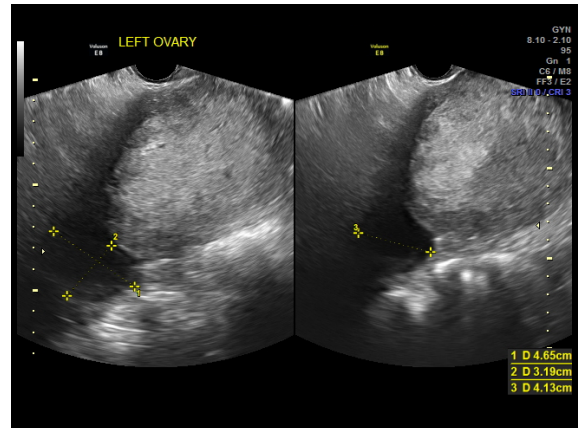
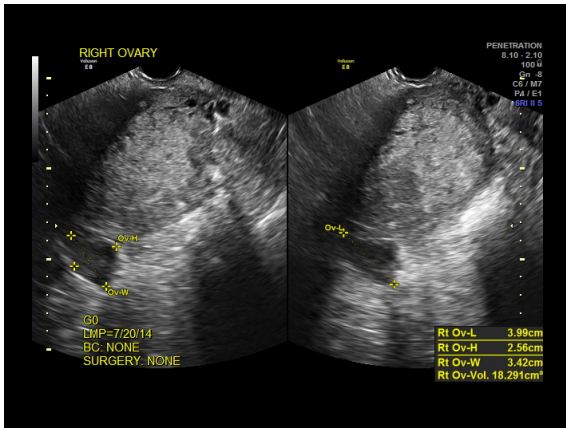
¹Coulam et al. Obstet Gynecol 1983; 61: 403-407.
²Hardiman et al. Lancet 2003; 361: 1810-1812.



24 y.o. with Oligomenorrhea/ Menorrhagia

- G0
- Long-standing oligomenorrhea, now with menorrhagia
- BMI 73.2 kg/m²





Endometrial Biopsy

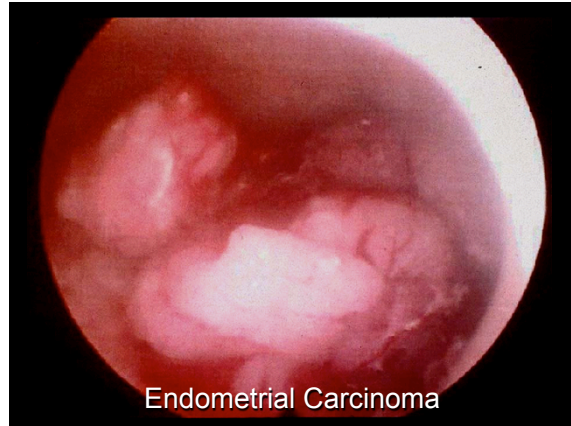
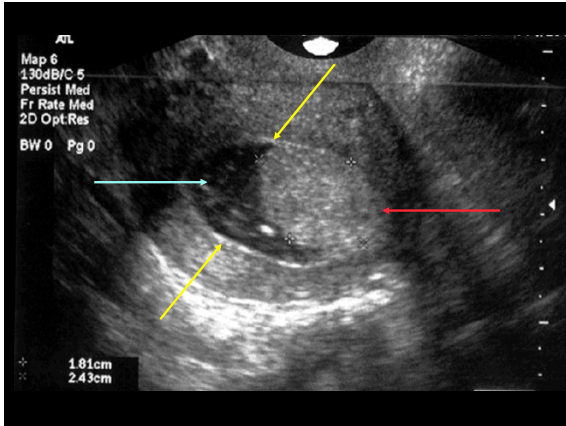
- Well-differentiated adenocarcinoma of the endometrium

Endometrial Evaluation Histologic Evaluation

- **Options**
 - Endometrial biopsy
 - Dilatation and curettage
- **Diagnosis best made by tissue biopsy**
 - Hormonal dysregulation
 - Endometritis
 - Endometrial hyperplasia
 - Diffuse malignancy

Postmenopausal Bleeding

- 58 yo G1P1001 with persistent postmenopausal bleeding
- Endometrial biopsy x 3
 - **Tissue insufficient for diagnosis**



Endometrial Carcinoma

Pipelle endometrial sampling. Sensitivity in the detection of endometrial cancer.

Author	Year	#	Sens	Journal
Zorlu	1994	26	95%	Gyn Ob Invest
Stovall	1991	40	97.5%	Obstet Gyn
Guido	1995	65	83%	J Reprod Med
Van den Bosch	1995	140	44.6%	Obstet Gyn

Evidence: II-1

Pipelle endometrial sampling. Sensitivity in the detection of endometrial cancer.

65 Patients with known endometrial cancer

- Endometrial biopsy prior to hysterectomy
- Adequate for analysis 63 of 65 97%
- Malignancy detected 54 of 65 83%
 - Missed: 5 on polyp
 - 3 disease < 5% of surface area
 - All < 50% of the surface

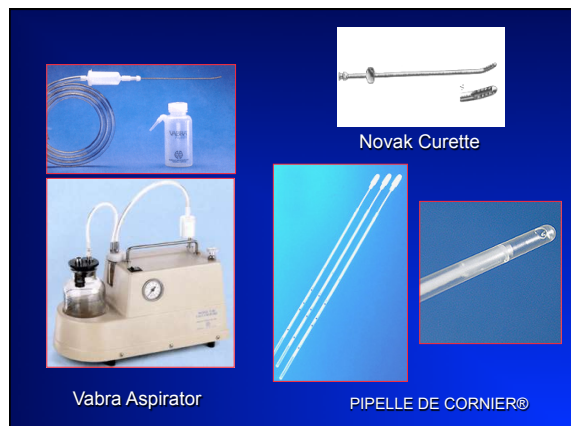
Guido et al. J Reprod Med 1995;40:553-555.

A comparison of Pipelle device and the Vabra aspirator

25 Patients scheduled for hysterectomy

- Percent surface area sampled
- Pipelle 4.2% ± 0.92%
- Vabra Aspirator 41.6% ± 5.7% (p<0.0001)
- Mean number of quadrants sampled (4 ant/4 post)
- Pipelle 2.4 ± 0.41
- Vabra aspirator 7.4 ± 0.42 (p < 0.0001)

Rodriguez, Yaqub, and King. Am J Obstet Gynecol 1993;168: 55-59.



Vabra Aspirator

Novak Curette

PIPELLE DE CORNIER®

A comparison of Pipelle device and the Vabra aspirator

25 Patients scheduled for hysterectomy

Percent surface area sampled		
Pipelle	4.2% ± 0.92%	
Vabra Aspirator	41.6% ± 5.7%	(p<0.0001)
Mean number of quadrants sampled (4 ant/4 post)		
Pipelle	2.4 ± 0.41	
Vabra aspirator	7.4 ± 0.42	(p < 0.0001)

Rodriguez, Yaqub, and King. Am J Obstet Gynecol 1993;168: 55-59.

How should we investigate women with postmenopausal bleeding?

76 Postmenopausal women

- Pipelle in outpatient clinic
- TVS prior to outpatient hysteroscopy/D&C
 - Abnormal: Endometrial thickness > 5 mm
- Hysteroscopy and Curettage

Gupta et al, Acta Obstet Gynecol Scand 1996;75:475-479.

Type II-1

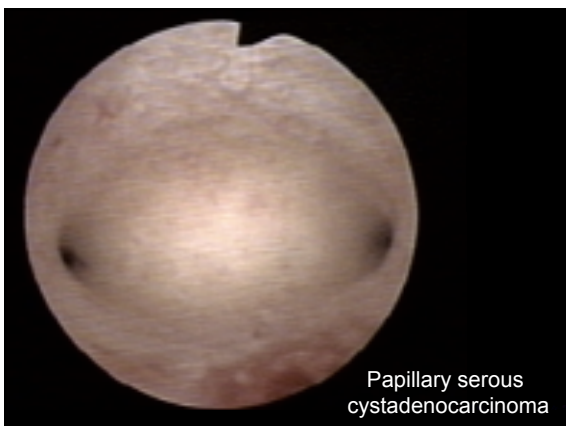
How should we investigate women with postmenopausal bleeding?

- Pipelle
 - Successful Sensitivity: 70%
- TVS
 - Sensitivity: 83%
 - Specificity: 77%
 - Positive predictive value: 54%
 - Detected 5 ovarian tumors
 - (3 missed on pelvic exam, 2 malignant)

Gupta et al, Acta Obstet Gynecol Scand 1996;75:475-479.

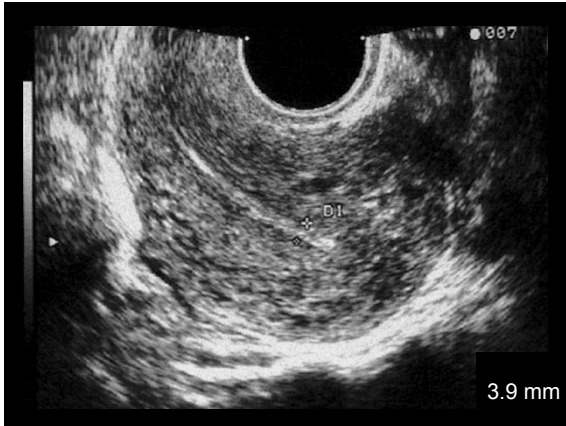
Postmenopausal Bleeding

- 61 yo G3P1021 with postmenopausal bleeding
- Spotting x 2 months



Postmenopausal Bleeding

- 63 yo G2P1011 with postmenopausal bleeding
 - For 3 days
 - 3 weeks ago



ACOG COMMITTEE OPINION
 Number 440 • August 2009

The Role of Transvaginal Ultrasonography in the Evaluation of Postmenopausal Bleeding

- Endometrial thickness < 5 mm
 - 82% could have a biopsy performed
 - 27% had adequate tissue
 - 73% had TIFD

ACOG Committee Opinion, Number 440, August 2009

ACOG COMMITTEE OPINION
 Number 440 • August 2009

The Role of Transvaginal Ultrasonography in the Evaluation of Postmenopausal Bleeding

- Initial evaluation may be with either EMB or TVS
- Endometrial thickness > 4 mm should trigger further evaluation
 - EMB
 - Sonohysterography
 - Hysteroscopy
- EMB with TIFD requires additional evaluation

Endometrial Thickness and Postmenopausal Bleeding

Reference	ET (mm)	#	# CA	NPV (%)
Karlsson 1995	≤ 4	1168	0	100

Risk of Cancer = 1/917

Epstein 2001	≤ 5	97	0	100
Gull 2003	≤ 4	394	0	100

Postmenopausal Bleeding

- Endometrium = 3.9 mm
- Option A
 - No further bleeding
- Option B
 - Repeat episode of bleeding 8 months later

Can Ultrasound Replace D&C?

- 394 postmenopausal women referred for PMB (1987-1990)
- Menopausal if > 1 year w/o bleeding
- Ultrasound and D&C
- 10 year follow-up (n = 339)

Gull et al. Am J Obstet Gynecol 2003; 188: 401-08. Göteborg, Sweden

Recurrent PMB - None

Endometrial Thickness	#	CA
≤ 4 mm	134	0
5-7 mm	31	0
≥ 8 mm	22	0
Unmeasurable	4	0
TOTAL	191	0

Gull et al. Am J Obstet Gynecol 2003; 188: 401-08.
Göteborg, Sweden

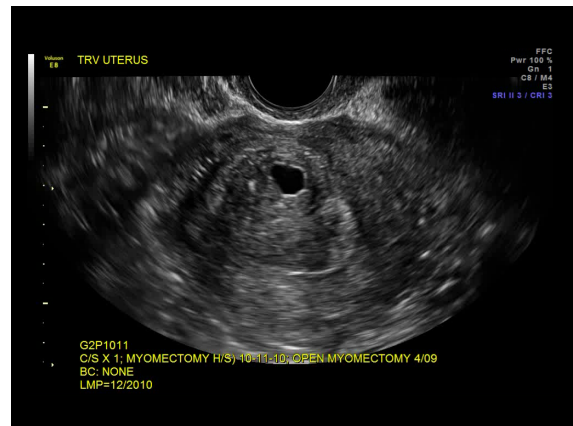
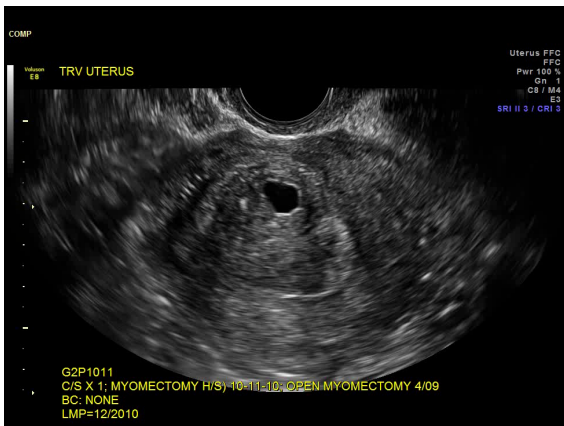
Recurrent PMB - Yes

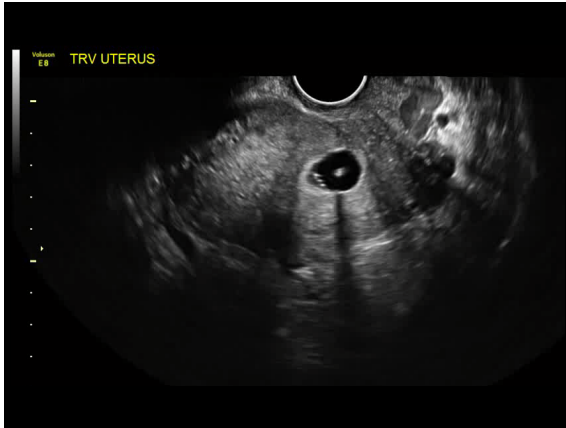
Endometrial Thickness	#	CA	Hyper	CA or Hyperp
≤ 4 mm	28	0	2 7.1%	2 7.1%
5-7 mm	9	3 33.3%	1 11.1%	4 44.4%
≥ 8 mm	28	4 14.3%	5 17.9%	9 32.1%
Unmeasurable	1	0	0	0
TOTAL	66	7 10.6%	8 12.1%	15 22.7%

Sonohysterography


38 y.o. G2P1011

- c/o of irregular and heavy bleeding
- Myomectomy 2009
- Hysteroscopic myomectomy 10/11/10
- C-section x 1






Sonobiopsy



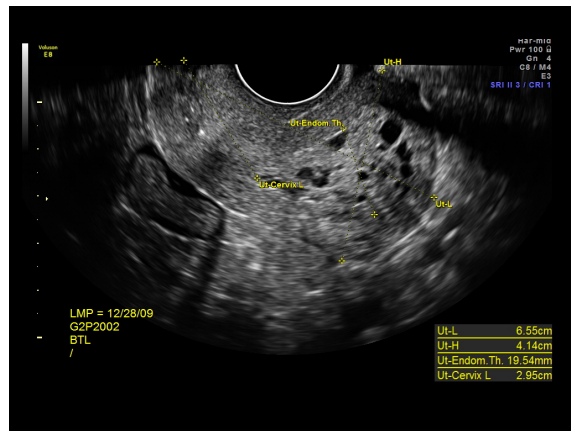
Bernard and Lécuru



Goldstein Sonobiopsy Catheter
7.2 Fr.

Sonobiopsy

- Evacuate fluid from catheter and syringe prior to biopsy
- Can be done with ultrasound guidance
- Withdraw the ultrasound probe prior to doing biopsy with Goldstein sonobiopsy catheter



Endometrial Aspiration at SIS Age > 50

- 603 patients
- Indication
 - PMB 73.8%
 - Thickened endometrium 15.3%
 - Suspected polyp 9.3%
 - Abnormal Pap 1.7%

Rotenberg et al. Obstet Gynecol 2015;125(2):414-23.

Endometrial Aspiration at SIS

- **Simultaneous**
 - Endometrial aspiration in all cases
- **Sequential**
 - Endometrial aspiration only if SIS is abnormal
 - Polyps
 - Focal lesion
 - Thickened endometrium

Rotenberg et al. Obstet Gynecol 2015;125(2):414-23.

Endometrial Aspiration at SIS

- | | |
|---|-------|
| If proliferative endometrium = Normal | |
| • Screen positive = surgery | 4.5% |
| • Missed hyperplasia or cancer | 13.3% |
| If proliferative endometrium = Abnormal | |
| • Screen positive = surgery | 13% |
| • No missed hyperplasia or cancer | |

Rotenberg et al. Obstet Gynecol 2015;125(2):414-23.

Conclusions

- Ultrasound is a reasonable first step in evaluation in patients with AUB
- ~ 1/3 will have an endometrial polyp or submucous myoma regardless of age

Conclusions

- Consider coagulopathies in patients based on historical information
- Consider endometrial biopsy as first-line evaluation in obese patients with long-standing oligo/amenorrhea

Conclusions: PMB Endometrial Thickness ≤ 4

- TVS endometrial thickness ≤ 4 mm is a reasonable threshold to avoid initial endometrial biopsy or SIS
- Recurrent abnormal vaginal bleeding requires further evaluation

Conclusions: Proliferative Endometrium

- Postmenopausal bleeding
- Proliferative endometrium on EMB may be abnormal
- May warrant further evaluation

Thank You

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