

2004 Guidelines for Ultrasonic Diagnosis of Breast Diseases

- Regarding the mass image-forming types-

Ei Ueno, MD

University of Tsukuba, Japan

JSUM revised the ultrasonic diagnostic criteria for breast diseases (established on November 30, 1988) and contemplated the new “2004 Guidelines for Ultrasonic Diagnosis of Breast Diseases.” There are 3 main revisions:

- (1) The term Diagnostic Criteria has been deleted from the title and replaced with Guidelines for Ultrasonic Diagnosis.
- (2) Breast lesions are categorized into mass image-

forming lesions and non-mass image-forming lesions. In the new guidelines, the description of mass image-forming lesions has been revised.

- (3) An explanation of tissue characterization has been added.

1. Ultrasonic Findings and Their Location on a Benign-to-Malignant Continuum

Table 1.

Findings	benign	←	→	malignant
Shape	round, oval/lobulated			
Border				
Definition	well defined			ill defined
Irregularity	smooth			rough
Halo	absent			present
Gland surface	continuous			interrupted
Internal Echoes				
Homogeneity	homogeneous			heterogeneous
High-echo spot	coarse			micro/small
Compressibility	easily deformed			non deformable
Depth/Width	small			large
Vascularity	avascular/hypovascular			hypervascular

Notes:

(1) Compressibility: Visually assessed by the degree of deformation caused by (1) applying external pressure to the tumor.

(2) Depth-Width Ratio (DW ratio, D/W)

Definition: the depth of the lesion divided by the width of the lesion. The largest part of the lesion is used in measuring the DW ratio. In the image, the width runs parallel to the skin and the depth crosses the width vertically. The DW ratio does not include the echogenic halo and is measured only in the hypoechoic part of the lesion. Threshold: the threshold is 0.7. (Exception: , The smaller the lesion, the larger the DW ratio of benign lesions such as cysts becomes. Therefore, it cannot be used for mass 1 cm or less.)

desirable to refer to the tissue condition (intensity of echoes).

2. Tissue Characterization and Ultrasonic Diagnosis

In diagnosing breast diseases, it is necessary to assess the tissue characteristics (basic echoic features). It is also

Reference

1. Kato Y, Ueno E, Kawauchi A, et al. Threshold of depth width ratio (D/W) in the breast. J Med Ultrasonics. 2002;29(suppl):450

Table 2. Tissue Characteristics and Conditions and Posterior Echoes

Posterior Echoes	benign	malignant
Accentuating	cyst, fibroadenoma papilloma, phyllodes tumor	solid-tubular carcinoma mucinous carcinoma medullary carcinoma papillary carcinoma malignant lymphoma squamous carcinoma
No Change	fibroadenoma, sclerosing adenosis lipoma	papillotubular carcinoma tubular carcinoma
Attenuating or Deficient	old fibroadenoma, complex cyst, scar sclerosing adenosis silicon granuloma fat necrosis	scirrhous carcinoma invasive lobular carcinoma

Note: (1) Intensity of Posterior Echoes

Posterior echoes depend on the attenuation of ultrasound caused by the lesion and reveal the tissue characteristics inside the lesion. The intensity of posterior echoes is classified into 3 levels by comparing with the surrounding echo intensity at the same depth. The 3 levels are accentuating, no change, and attenuating or deficient. Generally, lesions with high cellularity tend to accentuate and lesions with abundant fibrous tissue or calcifications tend to attenuate or become deficient. The table shows some typical cases.

Table 3. Tissue Characteristics and Conditions and Internal Echoes

Internal Echoes	benign	malignant
Anechoic	cyst	medullary carcinoma malignant lymphoma
Extremely low	sclerosing adenosis	medullary carcinoma malignant lymphoma scirrhous carcinoma solid-tubular carcinoma
Low	fibroadenoma papilloma	papillotubular carcinoma
Equal	papilloma fibroadenoma	mucinous carcinoma papillotubular carcinoma
High	lipoma panniculitis	mucinous carcinoma

Note: (2) Intensity of Internal Echoes (Echo Level)

The intensity of internal echoes is classified into 5 levels based on the echo intensity of subcutaneous fat, which is the standard. The 5 levels are anechoic (free), extremely low, low, equal, and high. Internal echoes are stipulated by reflection, back scattering, and the level of attenuation. Homogeneous masses that do not show any reflection or scattering, such as cysts, are echo free. The internal echo of solid tumors that are highly homogenous, such as medullary carcinoma and malignant lymphoma, tends to be extremely low. The internal echo of lesions that show high reflection and scattering, such as mucinous carcinoma and lipoma, tends to be equal or high. The internal echo of lesions with minute tissue and scarce scattering, such as scirrhous carcinoma, tends to be extremely low or low. The echo of fibroadenoma tends to be low or equal.