Clinical Practice Guidelines

QUALITY CONTROL OF MAMMOGRAPHY FOR BREAST CANCER SCREENING

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Introduction

Major randomized, controlled trials of breast cancer screening have shown that screening with mammography reduces breast cancer mortality by approximately 30%.1,2 The most problematic characteristic of screening mammography is the lack of standardization in its interpretation by radiologists.3 Interpretation of the mammographic image is difficult, as much an art as a science, and variation exists in the quality of interpretation. Guidelines have been developed to improve interpretation by radiologists and to monitor the quality of interpretation with outcome audits.4-6

Outcome audits define the characteristics of the women examined, the interpretations given, and the follow-up of outcomes to determine the accuracy of both the interpretations and the size of cancers detected. Intermediate or short-term benchmark measures that correlate with mortality reduction have been derived from the controlled screening trials.

Guidelines for quality assurance have evolved from these measures by which a screening program can document its effectiveness. By performing regular, periodic outcome audits of screening mammography practice and then comparing outcomes to the benchmarks of screening trials, screening providers can ensure that their own practices conform to the standards of the defined population trials.

Mammography Interpretation

The mammographic signs of early breast cancer are (1) tumor mass, usually irregularly marginated or spiculated, (2) small, grouped (clustered) calcifications with or without a mass, (3) poorly defined, asymmetric breast density, especially if this developed since a prior examination, and (4) distortion of the breast parenchymal architecture by scirrhous tumor.

The distinction between benign and malignant masses is made by analyses of the margins, shape, density, and size of the detected lesions. Generally, a benign mass such as a cyst, lymph node, and fibroadenoma has a sharply circumscribed margin, oval or round shape, and density equal to or less than the surrounding parenchyma. Fat-containing masses that are well circumscribed are always benign. Malignancies have a “benign” appearance in less than 1% to 2% of cases. Papillary, medullary, and colloid carcinomas are more likely to be well circumscribed than the more common ductal and lobular carcinomas.

Benign calcifications in the breast are usually more evenly scattered than clustered. Benign secretory calcifications are typically thick, linear, smooth, or ring-like. Calcifications in fibroadenomas are characteristic and coarse. Other benign types of calcifications in-chude the ring calcifications of the skin, typical parallel linear vascular calcifications, and the layered appearance of “milk of calcium” in small cysts. Alternatives to biopsies may be considered for lesions with benign characteristics.7-10 Mammographic surveillance at six-month intervals of a nonpalpable lesion with a very low probability of malignancy can confirm benignity and lack of growth, thus avoiding the cost and morbidity of biopsy. Stability of the size and appearance of the lesion for two years is reasonable evidence of its benignity. Several types of “probably benign” lesions are candidates for short-term surveillance: (1) punctate calcifications that are clustered and round or oval, (2) a solid, nonpalpable, noncalcified mass with a round or oval shape and sharply circumscribed margins, (3) focal asymmetric tissue density with concave margins and/or interspersed with fat, (4) a single dilated duct without mass, calcifications, or nipple discharge, (5) an architectural distortion in an area of known biopsy, and (6) multiple low-risk lesions that are similar in both breasts.

The most important and specific feature of malignant masses is a spiculated margin, which is due to the infiltrative nature of the breast cancer. Irregularity and indistinctness of margins are lesser manifestations of this phenomenon. Malignant calcifications are clustered, are usually greater than five per cubic centimeters of breast tissue, and may occur with or without a mass lesion. They typically have pleomorphic sizes and shapes, often with irregular margins and branching configurations.

The presence of microcalcifications accounts for approximately half of all the biopsies recommended for nonpalpable breast lesions, and their biopsy accounts for approximately half of all the nonpalpable cancers detected by screening. Of the microcalcifications that are associated with cancer, approximately 50% are ductal carcinoma in situ (DCIS). Of all DCIS cases, 75% to 90% demonstrate microcalcifications, alone or with a mass or density. Thus, microcalcifications are an important sign of early breast cancer.

Diagnostic mammography, with specialized views tailored to the clinical problem, is appropriate for a woman with a palpable mass. Breast ultrasound may be a better primary imaging modality to detect suspected breast cysts; alternatively, fine-needle aspiration of palpable abnormalities may be more useful than imaging. In any case, for women of any age, a palpable ab-normality with a normal mammographic interpretation should not be ignored. The main purpose of mammography is to detect breast cancer prior to its clinical detection, when it is nonpalpable. For the evaluation of palpable abnormalities, positive mammographic findings may confirm a diagnosis, but normal mammographic findings neither confirm benignity nor exclude cancer.

(See Please see hard copy for algorithm #1).
References