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Focus on Antibodies - July 2000

Myoepithelial Markers: An Aid in the Interpretation of Breast Biopsies

As all surgical pathologists know, the distinction of invasive breast lesions from certain types of noninvasive lesions can be a difficult one, particularly on small needle biopsy samples. Studies have shown that invasive breast carcinoma lacks an associated myoepithelial layer on the periphery of the invasive nests of tumor cells, although this layer is intact or partially intact in benign lesions and CIS. Therefore, identification of an intact or partially intact myoepithelial layer in a breast lesion provides supportive evidence of a noninvasive process. In the past, smooth muscle actin (SMA) was often used for this purpose, but due to the extensive cross reaction of SMA with myofibroblasts, interpretation of SMA immunostains in a number of these types of cases was problematic. Fortunately, there are several new markers of myoepithelial cells available (smooth muscle myosin heavy chains and calponin), that do not suffer from this problem (Fig. 1), and for this reason they are extremely useful as aids in the interpretation of certain difficult breast biopsies. Below is an example of a case where immunostains for smooth muscle myosin allowed a confident interpretation of a problematic case to be rendered.

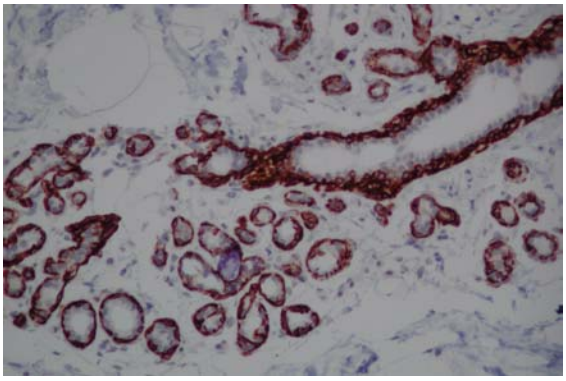

Fig. 1: Smooth Muscle Myosin Immunostain on normal terminal duct-lobular unit. The normal myoepithelial layer is highlighted nicely.

Case Study 46 year-old female with a mammographic lesion underwent stereotactic needle biopsies of the breast. Pathologic examination revealed a background of fibrocystic change, and one

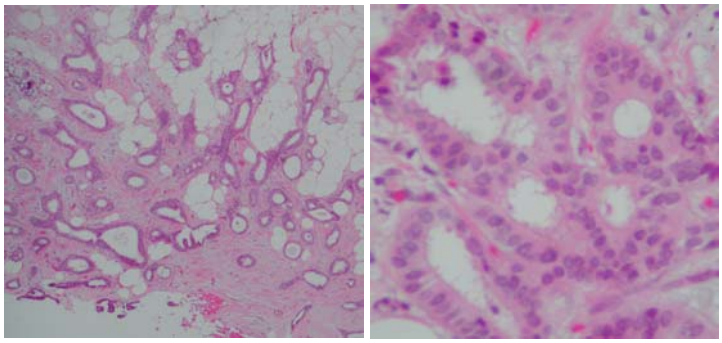

Fig 2: H&E sections of atypical ductal proliferation in breast.

focus that raised the possibility of tubular carcinoma (Fig. 2, preceding page). However, the examining pathologist was unsure based on morphology alone. For this reason, an immunostain for smooth muscle myosin heavy chains was requested, revealing an absent myoepithelial layer associated with the proliferating ducts of interest. (Figures 3-5). This finding provided strong evidence in support of the interpretation of tubular carcinoma, and allowed a definitive diagnosis of tubular carcinoma to be rendered.

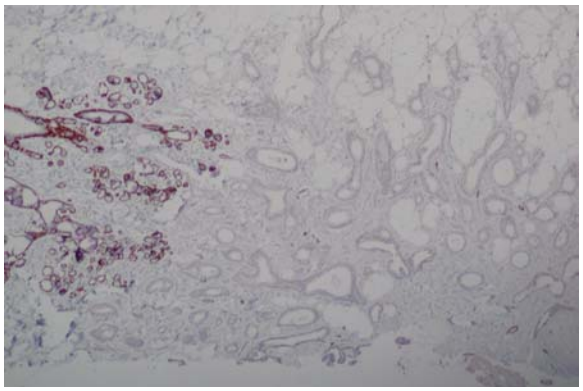

Fig 3: Low power photomicrograph of smooth muscle myosin immunostain, demonstrating normal ducts and lobules on the left, with the area of tubular carcinoma on the right.

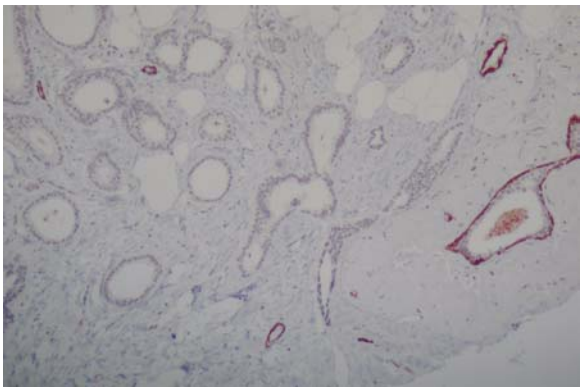

Fig 4: Medium power photomicrograph of myosin immunostain on tubular carcinoma. A normal duct (with intact myoepithelial cells) and a small blood vessel are noted on the right side of the photograph, but myoepithelial cells are absent from the area of tubular carcinoma.

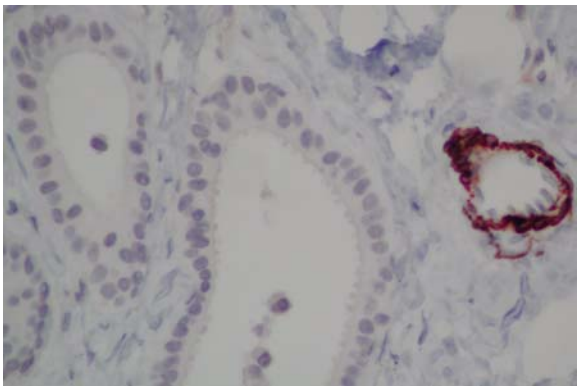

Fig 5: High power photomicrograph of myosin immunostain showing clear-cut absence of a myoepithelial layer surrounding the neoplastic ducts, with staining of the smooth muscle of an adjacent blood vessel wall noted on the right, serving as an internal positive control.

These new markers have been found to aid in the following differential diagnostic problems:

-- Radial Scar vs. Infiltrating Tubular Carcinoma
-- Cancerization of Sclerosing Adenosis by DCIS (mimicking invasive carcinoma)
-- Invasive Cribriform Carcinoma vs. DCIS
-- Adenoid Cystic Carcinoma vs. Collagenous Spherulosis or Cribriform DCIS
-- Papillary Carcinoma vs. Papilloma
-- Nipple Adenoma vs Infiltrating carcinoma.

References:

Yaziji H, Gown, Am, Sneige N: Detection of Stromal Invasion in Breast Cancer: The Myoepithelial Markers. Advances in Anatomic Pathology 7 (2): 100-109, 2000.

Wang NP Wan BC, Skelly M et al: Antibodies to Novel Myoepithelium-Associated Proteins Distinguish Benign Lesions and Carcinoma In-situ from Invasive Carcinoma of the Breast. Applied Immunohistochemistry 5 (3): 141-151, 1997.