Appendix

Pathological features of periductal mastitis and granulomatous lobular mastitis[1][2][3]

Periductal mastitis

1. General characteristics: the mass is under the nipple and areola, has a hard, tough texture, and lacks a capsule. The cut surface of the mass is gray or grayish-yellow. There are varying numbers of dilated ducts, the walls of which are thickened. These ducts contain sticky brownish yellow or light yellow material.

2. Characteristics on microscopic examination: (1) Concealed stage: the nipple and subareolar lactiferous ducts and terminal collecting ducts are dilated to varying degrees, having transverse diameters as big as 3–4 cm. The normal folds have disappeared and the epithelium is flat, cubic or absent. There are exfoliated epithelium, lipid secretions, cholesterol crystals, calcifications, and foamy tissue cells in the lumens of the ducts, which are surrounded by fibrosis, partial hyaline change, and mild inflammation. Small numbers of lymphocytes and plasma cells can be found locally. (2) Mass stage: There is significantly greater accumulation of material in the ducts than in the hidden stage and the duct walls may be damaged. There is also significantly greater infiltration of inflammatory cells, such as lymphocytes, plasma cells, and macrophages, around the duct walls, together with occasional neutrophils and eosinophils. Plasma cell aggregation may be the main feature, this condition being called “plasma cell mastitis”. (3) Abscess stage: There are multiple abscesses with loss of duct structures. The number of lymphocytes is equivalent to that seen in the mass stage, whereas broken neutrophils and foam cells are significantly more numerous. There are slightly fewer plasma cells than in the mass stage. Proliferation of interstitial fibrous tissue is more obvious. (4) Sinus stage: Sinus orifices appear after the abscess has ruptured. Microscopically, abscesses are no longer present. There
are about the same number of broken neutrophils and histiocytes as in the abscess stage, but no aggregates and fewer plasma cells and eosinophils.

Granulomatous lobular mastitis

1. General characteristics: these lesions have no capsule, a tough texture, and indistinct boundaries with surrounding tissues. However, the boundary is, rarely, distinct. The cut surface is grayish-white or gray-yellow, with nodules ranging in size from that of millet to that of a soybean. Small cysts may be present in the centers of some nodules.

2. Characteristics on microscopic examination: The lesions are multi-focal and centered on the breast lobules, to which they are generally confined. However, there may be a few outside breast lobules. The main feature is varying numbers of granulomatous inflammatory foci centered on the lobules; in some cases these are accompanied by micro-abscesses or central necrotic foci. The granulomas consist of epithelioid histiocytes, multinucleated giant cells (foreign body and Langhans types), surrounded by infiltration of a mixture of inflammatory cell, comprising mainly lymphocytes and neutrophils with occasional plasma cells and eosinophils. The terminal ducts may be dilated with periductal inflammation and destruction or proliferation of duct epithelium. The ducts’ lumens typically contain secretions, necrosis, and exudates. In patients with extensive lesions, the granulomas may merge, often resulting in reduction or disappearance of the ducts in the affected lobules. There is no cheese-like necrosis in the granulomas. Some granulomas have empty vesicles in their centers (often referred to as lipid-dissolving vacuoles). There are bands of aggregated neutrophils of varying width outside the vesicles, accompanied by infiltration of the peripheral area by lymphocytes, plasma cells, medium neutrophils, epithelioid histiocytes, and multinucleated giant cells. Some granulomas
lack vesicles in their central areas. Additionally, micro-abscesses may form by aggregation of neutrophils in the absence of granuloma formation.

