Ectopic Breasts: Familial Functional Axillary Breasts and Breast Cancer Arising in an Axillary Breast

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Supernumerary breasts and nipples are not uncommon and have familial and syndrome associations. Although usually of only cosmetic concern, hormonal changes and inflammatory or neoplastic conditions that affect primary breast tissue also may occur in areas of ectopic breast tissue. We describe cases of familial functional axillary breasts and primary carcinoma of the breast arising in ectopic axillary breast tissue.

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Supernumerary breasts and nipples have been of great interest throughout history.[1-4] The Phoenician goddess of fertility, Astarte, was portrayed with many breasts, representing virility and fertility. Chow Man, a Chinese king in 1150 BC, was reported to have 2 supernumerary nipples and thus was thought to have been endowed with divine powers. Anne Boleyn, the wife of King Henry VIII of England, was reported to have supernumerary nipples.[1-4]

The presence of multiple supernumerary nipples is referred to as polythelia, a Greek term meaning many nipples. Anomalies in breast development most commonly present as polythelia, but there are many variations including ectopic breast tissue with nipple and areola, increase in number of areolas only, or even only a patch of hair. Although predominantly of cosmetic concern, supernumerary breasts/nipples, or accessory mammary tissue, can develop with the same inflammatory and neoplastic conditions that occur in primary breast tissue. We describe cases of familial functional axillary breasts and primary carcinoma of the breast arising in ectopic axillary breast tissue.

Case Reports

Patient 1—A healthy 54-year-old woman presented with 4- to 5-mm pink-brown papules located superiorly to both breasts and at the anterior margin of each axilla (Figure 1). The papules had been present since birth. All 4 papules were surrounded by mild hyperpigmentation. The right axillary papule was accompanied by a subcutaneous component and surrounding hypertrichosis (Figure 2). The patient reported that her mother had axillary nipples and breast tissue that would enlarge and produce milk while breastfeeding her children. The patient had 2 sisters and 1 brother with supernumerary nipples. She also had 2 daughters, one with left axillary breast tissue that grew and became a notable cosmetic concern during her pregnancy. The diagnosis was familial functional axillary breasts.

Patient 2—A 45-year-old woman presented with a growing right axillary mass that measured approximately 1×2 cm. Biopsy results were consistent with a poorly differentiated infiltrating adenocarcinoma from a supernumerary right axillary breast. She had repeat excisions, a right modified radical mastectomy, and prophylactic left total mastectomy. There was no residual tumor in either breast. Eight years later she had a recurrent mass in her right axilla. Biopsy results revealed recurrence of a 2-cm

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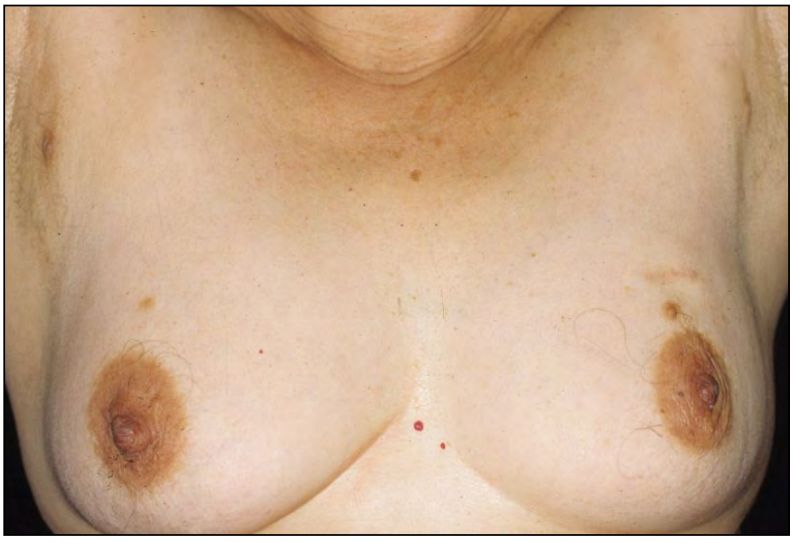

Figure 1. Supernumerary nipples superior to both breasts and supernumerary breasts with nipples in both anterior axillary vaults.

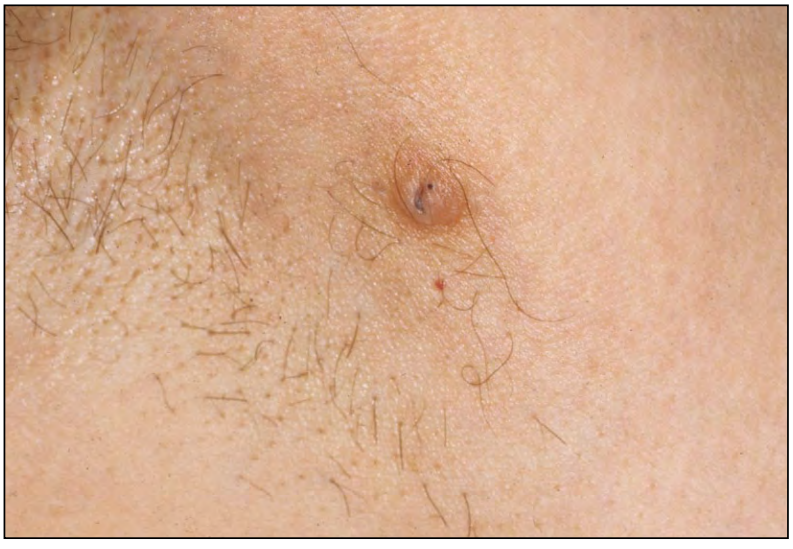

Figure 2. Right axillary supernumerary breast with nipple.

infiltrating ductal carcinoma. She was treated with repeat excision and radiation therapy. The diagnosis was primary carcinoma of the breast arising in ectopic axillary breast tissue.

Comment

Mammary glands are modified and highly specialized sweat glands. During the fifth to sixth week of development, mammary buds on the ventral surface of the embryo grow down bilaterally into the underlying mesenchyme and thicken into mammary ridges (milk lines) that extend from the axillary to inguinal regions.[5] The breast tissue continues to develop in the pectoral region with regression of the rest of the mammary ridge. Persistence of any other part of the original mammary crest may result in a supernumerary breast or nipple. Rare cases of supernumerary breasts and nipples located outside these lines are felt to be due to displaced embryologic mammary crests (Figure 3).[3] Sites outside the milk lines have included the face, ears, neck, arms, thighs, buttocks, back (particularly over the scapula), and vulva.[6-10] Supernumerary nipples usually appear as small pigmented, pink or flesh-colored papules along the mammary ridge. Ectopic breast tissue may present as a soft tissue swelling and may or may not have a surrounding hyperpigmented areola or nipple. Erectile function may be present. Histologically, polymastia may contain smooth muscle and mammary glands in the deep dermis. The overlying nipple may resemble a normal nipple with similar components of epidermal acanthosis, papillomatosis, hyperkeratosis, and pilosebaceous structures.

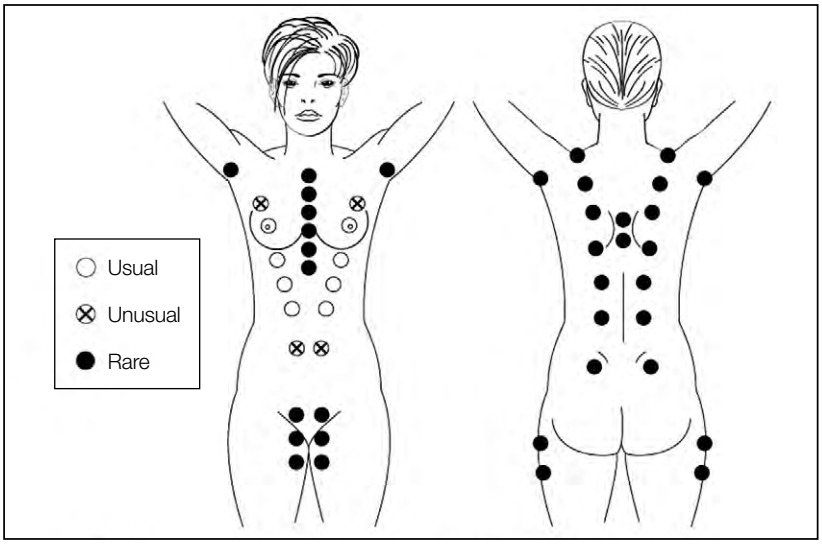

Figure 3. Supernumerary nipple sites. Adapted with permission from Leung and Robson.[3]

Incidence—The incidence of supernumerary nipples has varied, ranging from 0.1% to 5%.[1] Familial forms are less frequent than sporadic but represent approximately 6% of observed cases.[3,6,12] Reports of familial complete polymastia appear to be consistent with autosomal-dominant transmission with the responsible gene preventing the normal regression of the embryonic mammary ridge.[6] Family pedigrees also have shown X-linked inheritance.[13]

A single supernumerary nipple is more common than bilateral or multiple nipples. Some investigators have found supernumerary nipples to occur equally in men and women, but others have observed polythelia more frequently in either men or women.[6]

The incidence of ectopic breast tissue accompanying the supernumerary nipple is low. Ectopic breast tissue is more frequent in women and may become prominent during puberty, pregnancy, or lactation. The axilla is the most frequent site of presentation, though other areas along or outside the milk lines also have been reported.[2]

Classification—Kajava in 1915 classified supernumerary breasts and nipples into 8 categories: (1) complete breast with nipple, areola, and glandular tissue (polymastia); (2) supernumerary breast without areola but with nipple and glandular tissue; (3) supernumerary breast without nipple but with areola and glandular tissue; (4) aberrant glandular tissue only (ectopic breast tissue); (5) nipple and areola with gland replaced by fat (pseudomamma); (6) nipple only (polythelia); (7) areola only (polythelia areola); (8) patch of hair only (polythelia pilosis).[14] This classification is still in use, though newer classification schemes have been proposed.[1,2,14]

Clinical Significance—Oftentimes the accessory mammary tissue is mistaken as other diagnoses including nevi, acrochordons, fibromas, neurofibromas, and verrucae.[11] If only breast tissue is present, it may simulate a lipoma, lymphadenopathy, lymphoma, or hidradenitis suppurativa.[1,15]

Any disease that can occur in normally located breasts can occur in supernumerary breasts and nipples. Processes include abscesses, mastitis, benign and malignant tumors, and cysts. Pain, tenderness, and milk secretion can occur with fluctuating hormonal levels from puberty, menstruation, pregnancy, and lactation.

Although rare, carcinoma in supernumerary breast tissue is a serious concern, as described in our second case. The true incidence is not clear, but an incidence of 0.3% of all breast cancers has been reported in one large series.[16] Diagnosis may be delayed without a high index of suspicion, particularly in cases with no overlying accessory areola or nipple.[17] Most malignant neoplasms of ectopic breast tissue have been ductal carcinomas; however, other types have been reported such as papillary, infiltrating lobular, medullary carcinoma of the breast, and extramammary Paget disease.[17,18] The prognosis of ectopic breast carcinoma is not thought to be worse than carcinoma of normal breast by stage.[16,18] Some indicate that ectopic breast cancer seems to have a worse prognosis than cancer occurring in the normal breast and axillary carcinoma of the breast may have a particular tendency for early lymph node metastasis,[18] which may be from delay in diagnosis and the result of reporting bias with too few cases reported.

In a review of 90 cases of carcinomas of ectopic breast tissue, Evans and Guyton[16] reported that two-thirds were located in the axilla and the remaining one-third in the vulva and ectopic areas on the chest. The preoperative diagnosis was suspected in only 1 case.[16] Carcinomatous ectopic breast tissue has been reported in the vulva and even synchronous intraductal carcinoma of the breast and invasive carcinoma of ectopic breast tissue of the vulva.[9,18-21] Of note, the histologic diagnosis of mammary carcinoma in ectopic breast tissue can be difficult in both the axilla and vulvar regions where a carcinoma of adnexal origin and possible metastatic disease must be excluded, particularly carcinoma of the breast metastatic to the axillary lymph nodes.[21] Biopsy of any suspicious lesion is essential, as prognosis is better if found early.

Syndrome Associations—There are many associated conditions in individuals with accessory mammary tissue, yet conclusive evidence is controversial in most. Although many authors have discovered associations with nephrourinary malformations, such as adult dominant polycystic kidney disease, unilateral renal agenesis, cystic renal dysplasia, familial renal cysts, congenital stenosis of the pyeloureteral joint, multicystic kidneys, conjoined kidneys, and supernumerary kidneys, there are others that have not.[7,14,22-27] Other reported abnormalities have included cardiac conduction disturbances, congenital heart anomalies, pyloric stenosis, Becker nevus, epilepsy, and ear abnormalities.[7,22,27] Aslan et al[28] reported supernumerary nipples in children associated with various hematologic disorders.

Arthrogryposis multiplex congenita is a nonprogressive multiple articular rigidity syndrome with absence or incomplete development of certain muscles associated with polythelia. Simpson-Golabi-Behmel syndrome is an X-linked recessive disorder with prenatal or postnatal overgrowth, facial dysmorphic features, polythelia, heart malformations, cleft palate, and postaxial polydactyly.[13] Pallister-Killian Mosaic syndrome is a chromosomal disorder of tetrasomy 12p, characterized by severe neonatal muscular hypotonia, little bitemporal hair growth, prominent forehead, coarse face, pigment anomalies, profound mental retardation, seizures, diaphragmatic defects, and supernumerary nipples.[29] Acrofacial dysostosis of the predominantly postaxial type is a hereditary mandibulofacial dysostosis with hypoplasia of the extremities, especially oligodactyly, with accessory nipples.

Malignancies arising from other organs also have been observed in patients with supernumerary nipples, including Wilms tumor as well as renal cell, prostate, testicular, and urinary bladder carcinomas.[11] Mehes[30] reported a familial association of supernumerary nipples and renal adenocarcinoma in 3 first-degree relatives.

Management—Fortunately, most supernumerary breasts and nipples are asymptomatic and require no treatment. If there is physical discomfort, pain, tenderness, or unacceptable cosmesis, surgical excision may be performed. Any changes suspicious for malignancy should prompt a full examination and biopsy. The potential for an ectopic breast carcinoma should be considered in the differential diagnosis of an axillary or vulvar mass. It also is important to maintain awareness of the possibility of urogenital and other hereditary anomalies.

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