Subareolar Breast Abscesses: Characteristics and Results of Surgical Treatment

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Abstract: Our objective was to describe the characteristics of subareolar breast abscesses and to analyze the results of surgical treatment in relation to the prevention of recurrences. Almost 70% of patients smoked more than 10 cigarettes a day. The recurrence rate after excision of the lactiferous ducts was 28% and after management without excision of the lactiferous ducts was 79% (p < 0.001). Gram-positive bacteria were isolated more frequently in primary subareolar breast abscesses (not significant). Anaerobic microorganisms were more frequently cultured in recurring subareolar breast abscesses (p = 0.02). Definitive treatment of subareolar breast abscesses should consist of excision of the affected lactiferous ducts.

Key Words: abscess, breast, recurrence, subareolar, treatment

Today, almost 90% of nonpuerperal breast abscesses are subareolar breast abscesses. Zuska et al. (1) first described this distinct entity in 1951 as “fistulas of lactiferous ducts.” Subareolar breast abscesses are located in the retro- and periareolar areas. These abscesses occur as a result of obstruction of the lactiferous ducts by squamous metaplasia of their epithelium (2–4). Subareolar breast abscesses are troublesome and have a tendency to recur and to form extended fistulas (Fig. 1). Insufficient knowledge of the pathogenesis of subareolar breast abscesses may lead to inadequate surgical therapy. Although subareolar breast abscesses are a well-known disease entity, the choice of treatment remains controversial.

We reviewed the available literature on subareolar breast abscesses and performed a retrospective study of patients with nonpuerperal breast abscesses. We assessed risk factors, results of surgical therapy, histopathologic features, and microbiology.

PATIENTS AND METHODS

We retrospectively analyzed the data of all patients presenting in two hospitals with a breast abscess during a 6-year period. A breast abscess was defined as an inflammatory lump that yields pus spontaneously or upon incision.

Puerperal breast abscesses were defined as breast abscesses during pregnancy, during the first 3 months after labor without lactation, during lactation, or during the first 3 months after cessation of lactation (5–7). These patients were excluded from this study.

Nonpuerperal breast abscesses were divided into subareolar breast abscesses, located in the subareolar area or within 1 cm from the areola, and nonsubareolar breast abscesses, located more than 1 cm from the areola.

One 3-year-old child with a breast abscess located in the subareolar area was excluded from this study because...
of insufficient documentation. Two children with mastitis neonatorum with abscess formation, defined as breast abscesses during the first year of life, were also excluded.

All patients with subareolar breast abscesses received a questionnaire to establish whether more abscesses had appeared after their last follow-up. The answers were used in addition to the case notes. The investigated parameters were gender, age, treatment methods, number of recurrences, smoking habits, histopathologic features, and microbiology. In patients with nonsubareolar breast abscesses, we searched for etiologic factors. Fisher’s exact test was used for statistical comparison.

RESULTS

Of 136 patients presenting with a breast abscess, 101 patients had nonpuerperal breast abscesses and 35 patients had puerperal breast abscesses. Of the remaining 101 patients, 13 patients had nonsubareolar breast abscesses and 85 patients subareolar breast abscesses. The total number of subareolar breast abscesses in these 85 patients was 204 (Fig. 2). The follow-up period ranged from 1 week to 10 years.

Subareolar Breast Abscesses

The median age of the 85 patients (82 female and 3 male) presenting with subareolar breast abscesses was 35 years (range 14–59 years). Recurrences of subareolar breast abscesses were seen most frequently 1–2 months and 1–2 years after the primary event.

Smoking habits were determined in all but one patients. Almost 70% (57/84) of patients smoked more than 10 cigarettes a day.

A variety of methods of treatment were used for 202 of 204 subareolar breast abscesses. Details of treatment in two subareolar breast abscesses could not be found. Why a specific method of treatment was used was not always clear and therefore was not reviewed. Methods of treatment were divided into two groups: those including excision of the lactiferous ducts and those not including excision of the lactiferous ducts. Examples of surgical treatment including excision of the lactiferous ducts are microdochectomy, wedge excision, and excision of the affected lactiferous ducts. Incision and drainage, fistulectomy, and cone excision are examples of surgical treatment not including excision of the lactiferous ducts. The overall recurrence rate was 28% (11/39) after excision of the lactiferous ducts, while it was 79% (128/163) after management without excision of the lactiferous ducts (p < 0.001).

To assess the histology, several histopathologic characteristics of subareolar breast abscesses were selected, including chronic inflammation, fibrosis, abscess formation, fistula, squamous metaplasia of duct epithelium, dilatation of the lactiferous ducts, cell debris in the lactiferous ducts, and keratin plugs in the lactiferous ducts. Only 53% (108/204) of cases were studied microscopically. A great variety of histopathologic features were found, including chronic inflammation and abscess formation without the presence of other characteristics.

Gram-positive bacteria were isolated more frequently in primary subareolar breast abscesses compared to recurring subareolar breast abscesses (Table 1). In primary subareolar breast abscesses, the aerobic and facultative microorganism that was isolated most frequently was Staphylococcus aureus (79%). In recurring subareolar breast abscesses, S. aureus was isolated in only 37% of cases; however, this was not statistically significant. Anaerobic microorganisms were more frequently cultured in recurring subareolar breast abscesses compared to primary subareolar breast abscesses (p = 0.02) (Table 1).

Table 1. Percentage of Microorganisms Isolated in Subareolar Breast Abscesses

| Aerobic and facultative microorganisms | Anaerobic microorganisms | Gram positive and negative | No isolation | Positive | No isolation |
|----------------------------------------|--------------------------|---------------------------|--------------|----------|--------------|
| Primary abcess                          | 52                       | 5                         | 10           | 33       | 28           | 72           |
| Recurring abcess                        | 28                       | 12                        | 5            | 55       | 66           | 34           |
Nonsubareolar Breast Abscesses

The median age of the 13 female patients with non-subareolar breast abscesses was 46 years (range 29–78 years). Causes for the nonsubareolar breast abscesses were found to be cystic breast disease, inflammatory breast carcinoma, and fat necrosis following radiotherapy. Two women with a history of breast cancer presented with a nonmalignant abscess in the same breast. No specific cause for these abscesses was found. One woman presented with an abscess at the entry site of a central venous catheter.

DISCUSSION

In this study, subareolar breast abscesses constituted 94% of all nonpuerperal breast abscesses. The pathogenesis of subareolar breast abscesses starts with squamous metaplasia of the cuboidal epithelium lining the lactiferous ducts and the ampullae, which causes keratinization. This leads to obstruction of the ducts by keratin plugs and cellular debris (Fig. 3). Dilatation of the ducts and ampullae occurs because of the accumulation and stasis of secretory material from the acini. The thin, columnar epithelium lining the lactiferous duct ruptures, resulting in bacterial invasion of the surrounding tissue. This results in the formation of an abscess situated beneath the areola. The abscess may drain spontaneously, opening into the vermilion border of the areola. Eventually it will form a chronic fistula (3). When spontaneous or surgical drainage is the only treatment, the abscess will recur because of distal obstruction of the lactiferous duct and ampulla with keratin debris, as mentioned above.

A variety of hypotheses are suggested concerning the cause of the squamous metaplasia. It may be due to a complication of comedomasitis (1), a congenital anomaly of the lactiferous ducts (4), nipple retraction (8), or a relative state of vitamin A deficiency (9–11). In this series, smoking was an important risk factor, as already shown by Dixon et al. (12). It is speculated that smoking has either a direct toxic effect on the retroareolar lactiferous ducts or an indirect effect via hormonal stimulation of breast secretion (11,13–15). Also, plasma levels of β-carotene are lower among cigarette smokers than among nonsmokers (10,11), possibly explaining why squamous metaplasia occurs more frequently in smokers.

The differential diagnosis of nonpuerperal breast abscesses includes chronic recurrent subareolar breast abscess, inflammatory breast carcinoma, cystic breast disease, duct ectasia, and fat necrosis (16–21), as well as various other conditions (19,22–30). Establishing a correct differential diagnosis is necessary to institute proper treatment. As to the treatment of chronic recurrent subareolar breast abscesses, a biopsy of the chronically infected tissue should always be performed in view of the possible association with carcinoma (8,18).

The present study shows a significantly lower recurrence rate of subareolar breast abscesses after treatment that includes excising the lactiferous ducts compared to treatment without excision of the affected lactiferous ducts. Review of the literature identifies other modalities of treatment as well, including major duct excision, partial nipple resection, and even mastectomy (2,31,32). Today most studies agree that administration of antibiotics may be an effective treatment if a periareolar inflammation without abscess formation is present. If periareolar pus develops, incision and drainage of the abscess should be performed first, followed by excision of the affected lactiferous duct and the chronically infected tissue to prevent recurrences (1,3,4,8,31–39). Some studies report successful treatment of breast abscesses by repeated aspiration combined with administration of antibiotics (40,41). As a wide spectrum of both aerobic and anaerobic microorganisms may cause nonlactational breast infections (17,42,43), a combination of amoxicillin and clavulanic acid or a combination of cephradine and metronidazole is advised (40).

The present study shows how difficult it is to interrupt the chronic recurring nature of subareolar breast abscesses. It is only possible when the abscess and its associated ampulla and major ducts are excised.

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