

# Recurrent periductal mastitis: Surgical treatment

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**Background.** Recurrent periductal mastitis is a benign breast disorder that often features a mammary fistula that runs between periareolar skin and the ductal mammary system. Due to the high recurrence rate of this disease, its management is controversial. This study was designed to assess the efficacy of fistulectomy (Hadfield operation), particularly with regard to its long-term outcome.

**Methods.** We reviewed all women with recurrent periductal mastitis who underwent the Hadfield operation in the Breast Center in S.Orsola-Malpighi Hospital (Bologna University) from 2005 to 2015. All but one of the patients were heavy smokers and presented with a recurrent periareolar abscess and a periareolar mammary fistula.

**Results.** Eighteen women underwent the Hadfield surgical treatment. Mean age at the time of presentation was 42 years; 17 of 18 women smoked >10 cigarettes/d. All patients had a breast ultrasonography or mammography. Half of the patients had undergone antibiotic therapy with one or more prior abscess drainages or another form of operative treatment. All patients who underwent operative treatment had no postoperative events and were satisfied with the cosmetic results. Squamous metaplasia was always present in the specimens. After a median follow-up of 36 months, 2 patients developed a recurrence after a few months; neither had stopped smoking.

**Conclusion.** Based on our review of the literature and taking into account the results of this study, it seems clear that the best treatment involves a combined total excision of the affected duct and the fistulous tract. Due to the important role of smoking in this disease, it is important to encourage patients to stop smoking. (Surgery 2016;■.■-■.)

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RECURRENT PERIDUCTAL MASTITIS is a benign condition affecting a major breast duct and is responsible for 1–2% of all symptomatic breast conditions. Clinically, this condition involves a noncyclic mastalgia, nipple discharge, nipple retraction, a subareolar breast mass with or without overlying breast inflammation, and a periareolar abscess or often a mammary fistula. This pathology was first recognized by Birkitt<sup>1</sup> in 1850, who referred to it as a “morbid condition of lactiferous ducts”; later, in 1923, Bloodgood<sup>2</sup> described this condition as “varicocele tumor of the breast” because of the frequent finding of palpable, subareolar dilated ducts with a periductal inflammation. In 1951, Zuska et al<sup>3</sup> described the true nature of this

condition as mammary duct fistula.<sup>4,5</sup> In 1953, Atkins first used the term “mammary fistula” to describe a chronic infection comprising  $\geq 1$  subcutaneous abscess in the region of areola, which discharged spontaneously and appeared to resolve only to recur again<sup>6</sup>; thus, this condition has been called Zuska disease.<sup>3</sup>

The pathogenesis of this condition is complex. One of the major predisposing factors is duct ectasia, and both aerobic and anaerobic bacteria can be cultured from nipple secretions in the majority of such cases. The likelihood of culturing anaerobic bacteria from an abscess and the chance of developing a fistula are both increased in heavy smokers<sup>7</sup>; indeed, recent studies confirm that smoking is a major factor in the etiology. Smoking may damage the subareolar ducts, either as a direct toxic effect or as an indirect effect on hormonal release or blood flow, and the lesions may then become infected with anaerobic bacteria.<sup>8</sup>

The pathologic finding of this disease is a squamous metaplasia possibly due to congenital factors but more likely due to the effects of smoking that act on epithelial cells. Desquamated

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**Fig 1.** (A) Chronic infection comprising a subcutaneous abscess in the region of the areola and a periareolar skin opening (fistula) that communicates with the lactiferous duct. (B) Probe passed from the periareolar opening through to and out of the nipple before the incision of the skin. The periareolar incision follows the edge of the areola and the opening of the periareolar fistula is included in the skin incision and excised. (C) The tract (fistula) is excised within the skin incision, leaving the probe in place (which facilitates the excision), removing also the subcutaneous tissue. (Color version of this figure is available online.)

epithelial cells can form a plug in the retroareolar major ducts, which blocks the proximal lactiferous duct. Obstruction by debris exacerbated by squamous metaplasia of the duct epithelium is a good substrate for the growth of bacteria.<sup>6</sup>

Squamous metaplasia is usually present in the duct and is associated with a general distension of the affected duct due to a subacute to chronic inflammation and the production of an inflammatory mass in the interstitial tissue around the fistula and its duct. There is a diffuse spread of the inflammatory reaction that then involves a large part of the interstitial tissue involving the major breast ducts.<sup>9</sup> The clinical features usually involve a chronic infection comprising  $\geq 1$  subcutaneous abscess in the region of the areola, which discharges spontaneously, then appears to resolve only to recur again. All patients exhibit a periareolar skin opening (fistula) that communicates with the lactiferous duct opening (Fig 1, A).

The management of a mammary fistula has been mentioned in the literature; fistulotomy, described for the first time by Atkins<sup>10</sup> in 1955, is recognized as the Hadfield operation,<sup>9</sup> which involves total excision of the major ducts, fistulectomy with primary closure, and a nipple reconstruction.

## METHODS

We reviewed all women with recurrent periductal mastitis who in the last 10 years underwent the Hadfield operation at the Breast Center in S.Orsola-Malpighi Hospital (Bologna University). We analyzed age, smoking habit, previous abscesses, nipple abnormalities, imaging, antibiotic therapy, operative technique, and histopathologic findings. Patients presented with noncyclic mastalgia, nipple discharge, nipple retraction, a

subareolar breast mass with or without overlying skin inflammation, and a recurrent breast abscess with a periareolar skin opening and communication with the lactiferous duct.

### Operative technique (Hadfield operation).

Before the incision of the skin, a probe was passed from the periareolar opening through to and out of the nipple (Fig 1, B). The periareolar incision includes the opening of the periareolar fistula. The nipple is elevated off the underlying breast tissue. The tract (fistula) is excised within the skin incision, leaving the probe in place. During the dissection, the dilated major ducts containing fluid can be identified (Fig 1, C). After hemostasis, the cavity caused by the excision is obliterated by layers of fine resorbable sutures.

If the nipple is originally inverted, it is gently everted and tacked down to the breast substance with a fine stitch. To keep the nipple everted, a purse-string suture may be used but is not always necessary. After completing the reconstruction of the nipple/areolar complex, the skin incision is closed. Some surgeons leave a small subcutaneous tissue vacuum drain to be removed after 24–48 hours; on rare occasions, antibiotic therapy is used postoperatively.<sup>9</sup>

## RESULTS

From 2005 to 2015, 18 women underwent the Hadfield operation at the Breast Center in S.Orsola-Malpighi Hospital (Bologna University). The patients ranged in age from 24 to 70 years with a median age at the time of presentation of 42 years. The majority of the women were heavy smokers (17/18 women) of  $>10$  cigarettes/d.

In 15 patients, the findings on ultrasonography confirmed the presence of a subcutaneous

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