How Mammillary Fistulas Should Be Managed

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Abstract: Mammillary fistulas are uncommon, but when they occur they cause prolonged morbidity. The etiology and management strategies are less well established. The purpose of this study is to evaluate the etiologic factors and assess the results of surgical treatment. It is a retrospective study of all patients treated for mammillary fistula from 1990 to 2001. The clinical data, including complications of surgical treatment, were collected from medical records. Fistulas were segregated into simple and complex fistulas before analyzing the results of surgical treatment. Thirty-five patients were treated during this period. A history of either drainage of a subareolar abscess or spontaneous rupture of an inflammatory mass preceded the development of mammillary fistula in the majority of patients. Previous Hadfield's procedure for duct ectasia contributed to the development of mammillary fistula in seven patients. Seventeen patients presented with simple fistula. A large proportion of them were treated by total duct excision in recent years, with a higher rate of recurrence (4/6). Eighteen patients presented with complex fistulas; two of them had recurrences following surgical treatment. The overall recurrence rate was 23%. The majority of the patients showed features of periductal mastitis on histologic examination. Postoperative wound infection was positively associated with fistula recurrence. The best management of mammillary fistula remains a problem. Simple fistulas should be treated by fistulectomy and primary closure. Total duct excision should be reserved for complex fistulas. Postoperative wound infection is also a major factor in fistula recurrence. All patients should receive antibiotics. Surgery for duct ectasia has caused fistulas in 20% of cases in our study, raising the issue of restricting total duct excision to more severe forms of the disease. Mammillary fistulas should be treated more appropriately in a specialized breast unit with particular interest in benign breast disease.

Key Words: fistulectomy, mammillary fistula, periductal mastitis, total duct excision

The term mammillary fistula was introduced and described by Atkins (1) in 1955 as an abnormal communication between the lactiferous duct and the breast skin. The entity had been reported about 4 years earlier by Zuska et al. (2). The etiology underlying the development of mammillary fistula is not well established. Atkins believed that mammillary fistula occurs as a result of obstruction to the duct from nipple inversion. Various hypotheses about the etiopathogenesis of mammillary fistula have been proposed since then. This reflects in its management, which remains uncertain.

Atkins proposed saucerizing the fistulous track and allowing the wound to granulate. Patey and Thackeray (3) suggested that the track be excised completely and Hadfield (4) recommended excision of major ducts. The majority of authors stress the importance of removing the originating duct.

The purpose of this study is to follow up the course of all patients presenting or referred with mammillary fistula, with the intention of evaluating the etiologic factors and pathologic findings, and to assess the results of surgical treatment.

Patients and Methods

This is a retrospective study of all patients treated for mammillary fistula from 1990 to 2001 in the breast unit at the University Hospital of Wales, Cardiff. The medical records of all these patients were reviewed, gathering clinical and operative details along with histologic data. Follow-up information was collected from case notes. Wound infection, wound breakdown, and recurrence of fistula, if any, were noted. Fistulas were segregated into simple (no previous surgery for fistula, no nipple discharge) and complex (multiple previous attempts at drainage of subareolar abscesses, continuing nipple discharge, previous attempt at fistula repair, previous total duct excision for other conditions) before analyzing the results of surgical treatment.

Results

A total of 35 patients (34 female, 1 male) with ages ranging from 21 to 48 years (median age 36 years) were
treated during this period. The duration of symptoms ranged from 4 to 104 weeks (median duration 20 weeks). Three patients had more than one fistula at the time of presentation, making a total of 42 fistulas. One patient presented with bilateral fistula and two patients developed contralateral fistula after a period of 2 years.

Fourteen patients previously had incision and drainage of 24 subareolar breast abscesses before presenting with a fistula. Events preceding the development of mammillary fistula are listed in Table 1. Nipple inversion was found in 15 patients (42%).

Of the 35 patients, 17 presented with simple fistulas and 18 presented with complex fistulas (multiple previous attempts at drainage of subareolar abscess, 3 patients; continuing nipple discharge, 4 patients; previous attempts at fistula surgery, 4 patients; previous Hadfield’s procedure for duct ectasia/periductal mastitis, 7 patients). Eight patients (23%) developed recurrence of mammillary fistula following surgical treatment after a median duration of 4 months (range 2–10 months).

### TREATMENT

In all cases, the fistula and its related ducts were identified by inserting a probe. Patients were treated either by fistulectomy or by total duct excision. The wounds were either closed primarily or allowed to granulate. The majority received an antibiotic. Those who developed fistula following total duct excision underwent fistulectomy with redo excision (the remaining ductal tissues were shaved off from the nipple skin) of the ducts. Recurrent fistula following fistulectomy was treated by excision and packing.

#### Simple Fistula

The results of surgical treatment of simple fistulas are shown in Table 2. A change in the management of simple fistulas has been noted in the last 5 years. During this period, the majority of patients were treated by Hadfield’s procedure. There were six recurrences (35%) following surgical treatment of simple fistulas. A higher recurrence rate was noted in simple fistulas treated by Hadfield’s procedure (4/6).

#### Complex Fistula

Eighteen of the 35 patients with 24 fistulas were classified as complex. There were two recurrences following surgical treatment. The results of surgical treatment of complex fistulas are shown in Table 3.

### PATHOLOGY

Reviewing the pathology, 22 patients (62%) clearly demonstrated features of periductal mastitis. In 10 patients, the fistulous track was lined either completely or partially with squamous epithelium. This represents metaplastic response to chronic inflammation. The remaining patients showed nonspecific inflammatory changes with no evidence of malignancy.

#### Bacteriology

Bacterial assessment from the fistulous track was not available in the majority of cases. However, pus from 14 patients with subareolar abscess grew mixed anaerobes in 10 patients and *Staphylococcus aureus* in 2 patients. Pus from the two remaining patients did not grow any organisms.

### Table 1. Events Leading to the Development of Mammillary Fistula

| Event                                      | No. of Patients |
|--------------------------------------------|-----------------|
| Incision and drainage of subareolar abscess | 14              |
| Spontaneous rupture of an inflammatory mass| 10              |
| Breast biopsy                              | 1               |
| Hadfield’s for periductal mastitis         | 6               |
| Referred with complicated fistula          | 4               |

### Table 2. Results of Surgical Treatment for Simple Fistula

| Procedure                                      | Patients | Fistulas | Recurrences |
|-----------------------------------------------|----------|----------|-------------|
| Fistulectomy and primary closure + antibiotic | 3        | 4        | 1           |
| Fistulectomy + primary closure (no antibiotic)| 2        | 2        | —           |
| Excision and packing                          | 4        | 4        | 1           |
| Total duct excision                           | 8        | 8        | 4           |

### Table 3. Results of Surgical Treatment of Complex Fistula

| Procedure                                      | Patients | Fistulas | Recurrences |
|-----------------------------------------------|----------|----------|-------------|
| Fistulectomy and primary closure + antibiotic | 6        | 6        | 1           |
| Fistulectomy and primary closure (no antibiotic)| 1        | 1        | 1           |
| Excision and packing                          | 2        | 2        | —           |
| Total duct excision + antibiotic              | 3        | 9        | —           |
| Redo excision + antibiotic                    | 6        | 6        | —           |
Six of 23 patients (26%) developed postoperative wound infection in spite of antibiotic use and 6 of 12 patients (50%) without antibiotic use developed postoperative wound infection. The overall infection rate was 34% (12/35). Augmentin was the antibiotic most commonly used, with a duration of antibiotic use ranging from a single dose to 7 days.

**DISCUSSION**

Mammillary fistulas are uncommon, but when occur they cause prolonged morbidity. The pathogenesis is not well understood. Initially duct obstruction secondary to nipple inversion was considered as a main factor in their pathogenesis (1). In our study, nipple inversion was found in 42% of patients. It has also been suggested that keratin plugs from the stratified squamous epithelium obstructs and dilates the proximal duct, which becomes infected and ruptures, leading to fistula formation (5). Keratin plug filling the duct was found in only one patient in our study, thus excluding this hypothesis. Histologic features of periductal mastitis were demonstrated in 21 patients (63%), favoring the idea of periductal mastitis/duct ectasia as the underlying cause for fistula development (6,7).

Mammillary fistulas are quite uncommon and the appropriate management is not well established. In our study, patients with simple fistulas have been treated by total duct excision in recent years. Half of the recurrences occurred following Hadfield’s procedure (total duct excision) for simple fistula. It is possible that performing total duct excision creates space for potentially infected ducts, with a subsequent increased risk of recurrence. This suggests fistulectomy is a more appropriate procedure for simple fistula (8,9) than the more complicated Hadfield’s procedure.

Twenty percent of mammillary fistulas were caused by total duct excision for duct ectasia/periductal mastitis, raising the issue of restricting total duct excision to more severe forms of periductal mastitis with discharge from multiple ducts.

The four patients who were referred with complicated fistulas and previous multiple surgeries for fistula were treated successfully without recurrence.

**CONCLUSION**

The best management of mammillary fistula remains a problem. Postoperative infection remains a major factor and needs to be addressed to reduce the risk of recurrence. Perhaps routine culture study of the fistulous tract prior to surgery might reduce the incidence of postoperative infection. Simple fistulas should be treated by fistulectomy and primary closure, and antibiotics should be provided for all patients. As the disease is uncommon, achieving a uniform policy in its management may be difficult. One should consider managing these cases in a specialized breast unit with particular interest in benign breast diseases.

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