

# Infant & Toddler Feeding Case Files

## 嬰幼餵哺檔案



Baby Friendly Hospital Initiative Hong Kong Association

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### Chronic Breast or Nipple Pain – Is it Intraductal Infection?

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Breast pain is a very common problem among lactating mothers. Most is due to poor attachment, blocked ducts, mastitis, improper pumping, oversupply, etc. and mothers usually respond well to appropriate intervention. However, it is not uncommon to see mothers having chronic breast pain that respond poorly to the usual treatment regimen.



#### Review of a Case Series at a Local Lactation Clinic

Patient records at the author's lactation clinic during the period from January 2017 to June 2019 were reviewed. There was a total attendance of 410 lactating mothers. Of these, 296 (72%) complained of breast/nipple pain or blocked ducts. Clinical diagnosis was made based on history, physical examination, breastfeeding observation and/or milk expression assessment. Among them, 129 (44%) had acute blocked ducts, mastitis, breast abscess or breast engorgement. In 133 (45%) patients, an empirical diagnosis of intraductal infection was made and they were treated with a 2-week course of topical anti-fungal and/or topical antibiotic medication. For those with persistent symptoms, another 2-3 weeks' treatment with oral Fluconazole was added. If symptoms still did not resolve completely, an oral antibiotic was prescribed.

The symptoms and signs of these 133 mothers with an empirical diagnosis of intraductal infection are listed and they are further categorized according to their treatment regimen (Table 1). Among these, 94 mothers (71%) resolved completely with topical anti-fungal and/or antibiotic treatment and 12 (9%) became symptom-free after taking 2-3 weeks of oral Fluconazole. The remaining 27 (20%)

became asymptomatic after further treatment with an oral antibiotic or continuing oral Fluconazole for more than 3 weeks.

Among the 27 mothers requiring prolonged treatment, the timing of symptom onset ranged from postnatal day 1 to 13.5 months (median 3.5 months). Among these, 12 had a history of nipple damage, 10 had received prior intrapartum or postpartum antibiotics treatment, and 11 were multiparous with a quarter of them having had similar problems when breastfeeding their first child. The median duration of oral medication was 5 weeks (range 2-17 weeks). All became symptom-free except for a few mothers whose nipple white bleb only resolved partially but remained painless.

**Table 1: Symptoms and Signs of Mothers with an Empirical Diagnosis of Intraductal Infection and Categorization into Different Treatment Groups (n=133)**

Treatment Groups	Topical Treatment Only (n = 94)	Addition of 2-3 Weeks of Oral Fluconazole (n = 12)	Further Addition of Oral Antibiotics or Continuing Oral Fluconazole for More Than 3 Weeks (n = 27)
Symptoms and Signs	No.	No.	No.
Breast pain	92	12	25
Nipple white bleb or exudate	45	10	16 (photo 1)
Recurrent blocked duct(s)	8	4	22
Nipple scab, crack	26	4	13
Skin rash, itchiness	23	0	5
Fever or flu-like symptoms	0	1	8
Pus in milk	0	0	8
Bloody milk	0	1	6



**Photo 1 : Nipple with exudates**  
*Clinical Photo Taken by the Author*

## The Nature of Intraductal Infection

### *Intraductal Infection – Candida and/or Bacterial Etiology?*

Historically, many mothers with chronic breast pain received anti-fungal treatment for presumed candida infection. However, some did not resolve completely even after weeks of anti-fungal treatment<sup>1,2</sup>. Some studies<sup>1-4</sup> supported a bacterial etiology and anti-bacterial treatment. In Betzold's meta-analysis of non-randomized trials<sup>5</sup>, mothers with deep breast pain had higher detection rates of microbes in their milk, contributing to the postulation of intraductal infection with Candida and/or bacteria.

Unfortunately, the infective etiologies in chronic breast pain remain controversial due to: (1) low rates of positive cultures; (2) non-standardized sampling method, e.g. lower rate of Staphylococcus aureus (S. aureus) in nipple swab if rinsed before sampling<sup>5</sup>; (3) positive cultures in milk samples of asymptomatic mothers<sup>6</sup>; (4) difficulty in confirming Candida infection either via culture or detecting its DNA by real-time polymerase chain reaction (RT-PCR)<sup>7</sup>; (5) lack of randomized controlled trials; and (6) conflicting study results.

### *What are the Microbes?*

In Witt's study<sup>8</sup> of 86 lactating mothers with chronic breast pain, nipple swab and breastmilk bacterial cultures were taken on enrollment. All mothers were initially given the conservative treatment (CTx) of topical antibacterial ointment and followed up 5 days later. Oral antibiotics (OTx) were prescribed to mothers with failed CTx. In the breastmilk cultures, **S. aureus and Coagulase negative Staphylococcus (CNS)** were the two commonest species identified<sup>5,8</sup>. Staphylococcus aureus was positive in 33% in the OTx group Vs 5% in the CTx group (p=0.001), while CNS (e.g. S. epidermidis) growth did not show statistically significant difference in both groups<sup>8</sup>. Other pathogens identified included  $\alpha$ - Hemolytic Streptococcus, Enterococcus, Diphtheroids, Klebsiella, Acinetobacter, Pseudomonas, Enterobacter and E. coli. The primary yeast found was Candida albicans.

### *Patho-physiology of Intraductal Bacterial Infection<sup>5,9,10,11,12</sup>*

Aggregates of micro-organisms, consisting of diverse communities of bacteria and fungi, that exist on surfaces in the environment including plant and animal tissues, are referred to as a **biofilm**. Existence of the microbes in this form increases their resistance to antimicrobial treatment and the human immune system. **Small colony variants (SCV)** are a subpopulation of bacteria with a slow growth rate, atypical colony morphology and unusual biochemical characteristics that render them difficult to identify in the laboratory. Clinically, they tend to persist in cells and are less susceptible to antibiotics than their wild-type counterparts, resulting in latent or recurrent infections that are difficult to eradicate.

It is postulated that **biofilm formation**, consisting of bacteria alone or mixed species of Staphylococcus and Candida, as well as **intracellular infection by SCV**, as shown in animal/in vitro studies, may lead to chronic or recurrent inflammation of epithelium and narrowing of milk ducts. High resolution ultrasound imaging shows that the milk duct is dilated and shortened when milk is flowing into milk duct during oxytocin reflex. At the end of milk removal, the milk duct becomes narrowed and lengthened. These dynamic changes at the **inflamed milk ducts produce deep breast pain** and the **narrowed milk ducts may cause recurrent blocked ducts**.

## **Clinical Approach to the Management of Suspected Intraductal Infection**

### ***What are the Clinical Features Suggestive of Bacterial Intraductal Infection?***

The literature<sup>1,3,4,8,9</sup> described deep breast pain, nipple white bleb, nipple crack and rash as common symptoms of chronic intraductal infection. Amir<sup>6</sup> suggested that nipple damage was a predictor of chronic breast pain, with a relative risk (RR) of 2.30 (95% CI 1.19 to 4.43. p=0.012). From the author's experience (Table 1), among the refractory cases, a history of recurrent blockage is suggestive of bacterial intraductal infection. It occurred in 22 out of 27 mothers in the group requiring prolonged treatment as compared to 4 of 12 and 8 of 94 mothers in the other 2 groups respectively. The association between recurrent blockage of ducts and persistent breast pain or bacterial intraductal infection has also been described<sup>9,13,14</sup>.

In sum, it is **difficult to rely on microbiological or molecular-based test** to diagnose intraductal bacterial / fungal infections.

### ***Choice and Duration of Antibiotics Treatment***<sup>2,3,4,8,9,16</sup>

The sensitivity result should be followed if bacterial culture is positive. If culture is negative, the narrow spectrum anti-staphylococcal penicillin is the first choice. In penicillin-allergic patients, either clindamycin or trimethoprim-sulphamethoxazole can be chosen. The Academy of Breastfeeding Medicine (ABM)<sup>9</sup> recommends using cephalosporin, amoxicillin/clavulanate, dicloxacillin or erythromycin.

Based on the postulated patho-physiology of biofilm formation and intracellular infection of small colony variants, macrolides may be a better choice because they penetrate intracellularly, and can act synergistically with host cationic proteins<sup>16</sup>. In addition, drugs with a higher pKa (such as macrolides) generally have higher milk/plasma ratios<sup>17</sup> and tend to concentrate in the milk. On the other hand, antibiotics that are active against the cell wall (e.g. dicloxacillin) may be less effective.

The ABM Protocol #26 recommends **2-6 weeks of oral antibiotics** for bacterial intraductal infection<sup>9</sup>.



#### #Ways to take specimen<sup>9</sup>:

- Nipple swab (intact skin): sweep the swab on the unwashed nipple and areola in a zigzag pattern. Avoid touching the skin on other parts of the breast.
- Nipple fissure or open wound: rotate the swab over the wound for 5 seconds
- Breast milk culture: Before sampling in a sterile container, irrigate the nipple with sterile saline, clean with alcohol wipe and allow it to dry. Then collect 5-10ml of clean catch mid-stream breast milk by hand expression.

### Key Messages:

1. Chronic breast pain may be indicative of intraductal infection, of which Candida is the most likely pathogen. However, in some cases, the infection may be bacterial or mixed.  
慢性的乳房疼痛表示乳管可能受感染。念珠菌是最可能的病原體，但也可能是細菌感染或混合感染。
2. The diagnosis of bacterial intraductal infection relies mainly on clinical assessment. The proportion of positive bacterial culture from breastmilk or nipple swab is not high.  
診斷細菌性乳管炎主要是基於臨床評估。在母乳或乳頭皮膚取樣檢測細菌而得到陽性結果的比率不高。
3. Bacterial intraductal infection is more likely if there is recurrent blockage of milk ducts.  
若出現復發性乳管閉塞，患細菌性乳管炎的機會較高。
4. The Academy of Breastfeeding Medicine recommends 2 to 6 weeks of oral antibiotic treatment for bacterial intraductal infection.  
母乳餵養醫學科學院建議治療細菌性乳管炎須口服抗生素，並維持 2 至 6 週。

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Views expressed in this article are the author's and do not necessarily reflect the opinion or position of the BFHIHK.

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