

# Granulomatous mastitis in multiparae during pregnancy and lactation

## Observational study (STROBE compliant)

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### Abstract

The incidence of granulomatous mastitis (GLM) in multiparae as seriously affected the quality of life and breastfeeding of pregnant women after delivery, but the treatment is rarely reported. In this article, the development, healing, and lactation of 13 cases were reported and a retrospective analysis was performed. 10 cases of GLM were treated at the Breast Disease Prevention and Treatment Center of Haidian Maternal & Child Health Hospital of Beijing and 3 cases of GLM were treated in the Breast Department of Weihai Municipal Hospital of Shandong province from February 2017 to May 2019.

Among the 13 patients, conservative symptomatic treatment was adopted during pregnancy and lactation: anti-infective therapy consisting of oral cephalosporin antibiotic for patients; ultrasound-guided puncture and drainage of pus or incision and drainage after abscess formation. Observation continued during the sinus tract phase. Postpartum breastfeeding was encouraged, especially on the affected side. In this study, the median healing time was 20 months and the average healing time was 30.4 months in 5 healthy breast lactation cases. In 8 cases of bilateral breast lactation, the median healing time was 30 months and the average healing time was 26.5 months. Linear regression test analysis: whether the affected breast was breast-fed after delivery had no effect on the postpartum wound healing time,  $P = .792$ . The wounds of 13 patients healed well after lactation, and none of them recurred since the last follow-up visit. There were no adverse events in all infants.

Conservative symptomatic treatment for GLM of multiparous women during pregnancy and lactation and encouraging breastfeeding after delivery have no effect on infant health and the recovery time of patients.

**Abbreviation:** GLM = granulomatous mastitis.

**Keywords:** breastfeeding, granulomatous mastitis, multiparous, pregnancy

## 1. Introduction

Granulomatous mastitis (GLM) cases in China have increased substantially in recent years, but the etiology is still unclear. GLM is common in women of childbearing age after delivery, but the incidence of GLM of women during pregnancy and lactation is rarely reported.<sup>[1,2]</sup> In this research study, 13 cases of GLM were followed-up during pregnancy and lactation.

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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## 2. Patients and methods

### 2.1. Patients

The clinical medical records of 10 cases of granulomatous mastitis (GLM) treated at the Breast Disease Prevention and Treatment Center of Haidian Maternal & Child Health Hospital of Beijing and 3 cases of GLM treated in the Breast Department of Weihai Municipal Hospital of Shandong province from February 2017 to May 2019 were selected as the research subjects (the procedures performed in the 13 cases conformed to the ethical standards formulated by Haidian Maternal & Child Health Hospital and the Ethics Committee of Weihai Municipal Hospital and were approved by the Committee. The authors have also obtained informed consent from the subjects, who all signed an informed consent form for clinical research).

### 2.2. Methods

Collection of medical history (Table 1). The case data of 13 patients were obtained through in-person diagnosis and an electronic questionnaire survey on wjx.cn. The patients were 28 to 40 years of age and consisted of 6 cases (46.2%) of left breast disease and 7 cases (53.8%) of right breast disease. Among them, GLM occurred in 7 patients during pregnancy with their second child, in 4 cases during pregnancy with their third child, and in 2 cases during pregnancy of the fourth (or higher) child. Among them, 5 cases had nipple depression on the affected side and 2 cases had gestational diabetes mellitus. All 13 patients adopted breastfeeding for the first several births, and the duration of

**Table 1**  
Clinical data of the patients.

Case	Age	Weeks of gestation at onset	Affected side	Complications	Weeks of gestation	Parity	First lactation time (months)	Whether the first child was exclusively breastfed
1	28	2	R	Gestational diabetes	4	2	28	Y
2	28	20	R	Inverted nipple on affected side	3	2	13	Y
3	35	18	R	Inverted	2	2	21	Y
4	37	20	L	Inverted	2	2	24	Y
5	30	38	L	None	2	2	18	Y
6	31	20	L	Inverted nipple on affected side	2	2	16	Y
7	40	36	R	None	3	2	17	Y
8	32	20	L	Gestational diabetes	3	2	12	Y
9	33	38	R	None	3	2	12	Y
10	30	34	L	Inverted nipple on affected side	2	2	18	Y
11	33	10	R	None	2	2	50	Y
12	29	12	R	None	2	2	24	Y
13	37	4	L	None	3	3	12	Y

breastfeeding ranged from 12 to 50 months. After disease onset, there were 8 cases of uneventful bilateral breastfeeding, 5 cases of breastfeeding on the healthy side only, and no cases of immediate weaning after delivery without breastfeeding. The diameter of breast granuloma ranged from 30 to 70 mm.

Observation of Indexes: the size of the mass, abscess formation, and rupture during pregnancy and lactation were observed by ultrasonic monitoring. Breastfeeding, whether the patient experienced any discomfort such as diarrhea and infection during breastfeeding of infants, and the healing time of granuloma lesions were observed after delivery.

Healing criteria: redness, pain, and lumps in the breast disappeared, and skin ulceration healed and did not recur within 2 months.

### 3. Results

#### 3.1. Relevant inspection results

At the initial stage of onset, all 13 cases were treated with a hollow needle or fine needle for pathology or incisional biopsy to obtain specimens. The pathological results did not reveal any malignant breast tumors and showed inflammation with both abscess and granuloma formation. The results of color Doppler ultrasound showed a heterogeneous medium echo to low echo, and part of the boundary was blurred; blood flow signals could also be observed inside. Multiple honeycomb-shaped hypoechoic or anechoic areas could be seen around the abscess or infection focus, and a small amount of liquid could be seen in some areas after pressurization. Bacterial culture of pus cavity secretion was negative in the 10 cases from our hospital.

#### 3.2. Treatment methods and results

Among the 13 patients, conservative symptomatic treatment was adopted during pregnancy and lactation: anti-infective therapy consisting of oral cephalosporin antibiotic for patients with or without fever who had inflammatory breast swelling and pain; ultrasound-guided puncture and drainage of pus or incision and drainage after abscess formation. Observation continued during the sinus tract phase.

Postpartum breastfeeding was encouraged, especially on the affected side. The healing time of postpartum granuloma is 2 to

18 months. The median healing time (it starts during pregnancy) was 20 months, and the average healing time was 30.4 months in 5 healthy breast lactation cases. In 8 cases of bilateral breast lactation, the median healing time was 30 months and the average healing time was 26.5 months. One case of GLM breastfed for 2 months, 2 cases breastfed for 3 to 6 months, and 10 cases breastfed for more than 6 months. The wounds of the 13 patients healed well after lactation, and none of them has recurred since the follow-up visit (Table 2).

#### 3.3. Statistics

Linear regression test analysis: whether the affected breast was breast-fed after delivery had no effect on the postpartum wound healing time,  $P = .792$  (Tables 3 and 4).

### 4. Discussion

GLM primarily affects married multiparous women, especially those with a history of childbirth or breastfeeding in recent years, but some cases occur during pregnancy or lactation.<sup>[2,3]</sup> The pathogenesis of GLM is unknown. It has been reported that breast duct ectasia is caused by lack of expression of the RAC1 gene, which prevents lactating cells in the breast from transforming into phagocytes after milk returns; this causes breast duct recession and long-term ectasia.<sup>[4]</sup> Brow et al.<sup>[5]</sup> proposed as early as 1979 that this disease was related to the immune response and local hypersensitivity caused by postpartum galactostasis. The pathogenesis of this disease, which is caused by milk secretion factors, may be increased breast secretion due to increased prolactin during pregnancy, increased duct secretions, expansion and ectasia of breast lobules and ducts, structural damage,<sup>[1]</sup> and local hypersensitivity due to the leakage of secretions into lobular connective tissues.<sup>[6]</sup>

GLM during pregnancy can cause severe physical and mental pain to expectant mothers. Breast lumps are red, swollen, and painful, but considering pregnancy, many conventional and effective drugs for granuloma, such as hormones, quinolone antibiotics, and traditional Chinese medicine, cannot be used. Because of safety concerns, physicians do not operate on granulomas during pregnancy. This center adopts symptomatic treatment for pregnant patients, performs puncture and pus drainage for lumps, applies cephalosporin antibiotics for anti-infective treatment for redness and inflammation, and does not

**Table 2**  
Management and response of the patients.

Case	Treatment	Lactation	Duration of breastfeeding during illness (months)	Postpartum treatment	Recovery after birth (weeks)	Breastfeeding time (weeks)	Health status of baby	Breast appearance	Breast scars
1	Antibiotics, punctured	both	>6	Antibiotics	48	85	health	Slight asymmetry	obvious
2	Antibiotics, punctured incision & drainage	both	0~3	punctured	0	19	Health	good	obvious
3	Chinese medicine	healthy side	>6	Chinese medicine	48	68	Health	Slight asymmetry	not obvious
4	Chinese medicine	both	>6	incision & drainage	32	50	Health	Slight asymmetry	obvious
5	punctured	both	>6	punctured	32	33	Health	good	obvious
6	punctured	healthy side	>6	punctured	72	90	Health	Severe asymmetry	obvious
7	punctured	both	>6	punctured	28	36	Health	Severe asymmetry	obvious
8	Chinese medicine punctured	healthy side	3~6	Chinese medicine	20	39	Health	Slight asymmetry	obvious
9	punctured	both	>6	Chinese medicine	48	49	Health	Slight asymmetry	not obvious
10	punctured	Healthy side	>6	punctured	8	13	Health	Severe asymmetry	obvious
11	Chinese medicine	both	>6	none	20	48	Health	Severe asymmetry	not obvious
12	punctured	healthy side	>6	none	4	40	Health	Slight asymmetry	obvious
13	punctured	both	>6	none	4	49	health	Slight asymmetry	not obvious

**Table 3**  
Independent variable assignment table.

Independent variable	Assignment
Mode of lactation	unilateral=0 bilateral=1
Breastfeeding time	< 6mons=0, ≥6mons=1

recommend immediate weaning intervention treatment after delivery. GLM has a certain self-healing property.<sup>[7]</sup> The highest response rate can reach 50% by simple observation, but the course of the disease is relatively long at 6 to 12 months or even 2 years (Figs. 1 and 2). Two patients recovered in 28 weeks; for those women who are pregnant or lactating, long-term close follow-up can be considered, and necessary imaging and histological examination are also indispensable.

After follow-up observation, 2 cases were cured during pregnancy, 8 cases in which bilateral breastfeeding was practiced were cured within an average of 26.5 months, and 5 cases that involved breastfeeding on the healthy side alone were cured within an average of 30.4 months. The affected breast in these patients often had nipple invagination to varying degrees. In this group, 8 cases were able to breastfeed efficiently on the affected side after delivery. We believe that the reasons for the smooth recovery of granuloma patients who breastfeed on the affected side after delivery are as follows:

1. Approximately 48 hours after delivery, with the onset of the second milk secretion period, the prolactin level in the mother's body increases, and the breast fully produces milk. At this time, the damaged glandular lobe also functions in milk

production, and the milk can dilute the inflammatory exudate produced by the granuloma. In addition, fresh milk is rich in anti-infective substances such as leukocytes, cytokines, and immunoglobulins, which is beneficial to repair damaged areas and to control infection. If the mother continues to breastfeed and milk is continuously discharged from the body, drainage will be unobstructed.

2. During breastfeeding, each glandular lobe duct system of the breast is rich in blood circulation and is in a state of vigorous metabolism, which is beneficial to inhibiting inflammatory reactions at the lesion site; this allows the lesion to be localized and non-spreading, thus shortening the disease course.
3. Al-Shehri<sup>[8]</sup> reported that the combination of saliva and breast milk for breastfed babies produced more hydrogen peroxide, thus inhibiting some bacterial infections and accelerating recovery from the disease.

However, the breast that is not subjected to breastfeeding lacks such protection. Therefore, GLM patients who are breastfeeding do not need to be weaned.

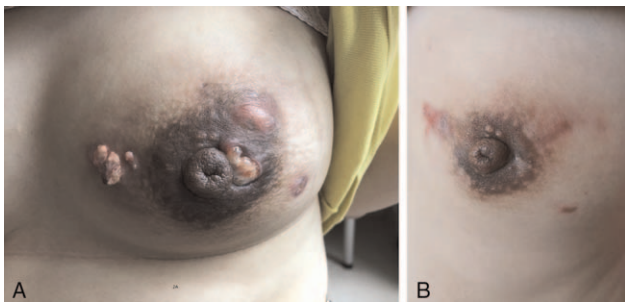
Most of the pus bacterial cultures of GLM patients were negative. No bacterial growth was found in the milk secretion cultures of 10 patients in this group. After follow-up visits, no complications such as diarrhea and infection were found in the breastfed infants, and the growth and development of the infants were all within the normal range, as assessed by pediatricians, which indicates that breastfeeding in GLM women will not be detrimental to the health of the infant. Considering the benefits of breastfeeding, we should encourage breastfeeding in these patients.

**Table 4**  
Taking the breastfeeding time and mode of lactation as independent variables and healing time as dependent variables, linear regression test results showed that breastfeeding time and mode of lactation were not correlated with healing time ( $P > .05$ ).

	B	Standard error	Standard coefficient	T value	P value
Constant value	9.030	33.324		0.271	.792
Mode of lactation	-5.582	13.071	-0.125	-0.427	.678
Breastfeeding time	22.761	17.625	0.379	1.291	.226



**Figure 1.** No 12 patient: 1A .At the first visit, when she was 3 months pregnant, her right breast redness and swelling; 1B After 1 month; 1C After 2 months; 1D After 3 months; 1E After 4 months; 1F After 4.5 months; 1G After 7 months, breast skin had healed. Her baby was born, her baby could not breastfeed from the right breast.



**Figure 2.** No 7 patient: 2A At the first visit, the patient was 9 months pregnant, pain in the right breast with a skin lesion; 2B After 7 month, skin of the breast had healed.

#### 4.1. Limitations

The small number of cases was the main drawback of this study.

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#### Author contributions

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