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ORIGINAL ARTICLE

Outcome of Surgical Treatment of Complicated Periductal Mastitis

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ABSTRACT

Keywords: Complicated Periductal mastitis (PDM), wide surgical excision, fistulectomy, extended excision.

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Background: Periductal mastitis (PDM) is a complex benign breast disease with a prolonged course and a high risk of recurrence after treatment. After failure of medical treatment, surgery is the option of choice, this consists of excision of all of the major ducts. **Aim and objectives:** This study aimed to evaluate the surgical treatment of complicated periductal mastitis after failure of medical treatment. **Subjects and methods:** In our prospective study, we included all patients presented with complicated periductal mastitis, from January to December 2022. **Results:** the mean age was 39.9 (±15.5 SD), the mean BMI was 27.82 (±2.49 SD) and there were 9 (18%) with hypertension, 2 (4%) with diabetes, 9 (18%) with HCV and 6 (12%) with recurrence of PDM. the mean operative duration was 65.66 (±9.14 SD), the mean duration of hospitalization was 2.62 (±0.99 SD) and among the studied cases there were 7 (14%) who didn't improve and 43 (86%) who improved. **Conclusion:** Mass, abscess, fistula and nipple retraction are most common manifestations of the disease. Wide surgical excision, fistulectomy and extended excision with transfer of a random breast dermo-glandular flap are effective surgical modalities for different types of PDM.

INTRODUCTION

Periductal mastitis (PDM) is one of the most common benign conditions affecting the breast. Incidence of PDM ranges from 5% to 10% in clinical studies to 25% in autopsy studies. [1] Moreover, PDM is considered the second most common cause of benign breast disorders next to breast cysts. [2]

Periductal mastitis is a dilatation of the breast ducts, which is often associated with periductal inflammation. [3] Moreover PDM is a type of non-specific inflammation. [4]

The most common presenting symptoms of PDM include nipple discharge, retro areolar abscess and mastalgia. Although 95% of nipple discharge is related to benign conditions, it alarms the ladies for fear of cancer. [1]

PDM is common in the younger age group, and there is association between smoking and PDM. [1]

Breast inflammation during breast feeding requires immediate and appropriate treatment. Without proper treatment, inflammation may cause the premature cessation of breast feeding, which is considered the normative standard for infant feeding and nutrition. [5]

Antibiotic therapy may be tried, the most appropriate agents being co-amoxiclav or flucloxacillin and metronidazole. Also, replead course of corticosteroid may be tried. However, surgery is often

the only option likely to bring about cure of this notoriously difficult condition; this consists of excision of all of the major ducts (Hadfield's operation). Failure to do so will lead to recurrence. [6]
The fate of surgical treatment of complicated PDM, the efficacy, clinical outcomes and complications are still controversial, therefore we will conduct this study to study these aspects.
Our aim in this study was to identify the efficacy, clinical outcomes, and complications of surgical treatment of complicated periductal mastitis after failure of medical treatment.

PATIENTS AND METHODS

This Prospective case study was conducted in general surgery department, Aswan University Hospital, Aswan, Egypt.
This study was conducted on all patients presented to Aswan University Hospital with complicated periductal mastitis, from January to December 2022.
Inclusion Criteria: Adult females**,** presented with nipple discharge (Serous, Milky and Pus) and failed medical treatment after being diagnosed with complicated periductal mastitis.
Exclusion Criteria: Response to medical treatment and Pregnancy.
50 cases of PDM that admitted to Aswan university hospital from January to December 2022.

Methods

The eligible subjects included in this study were subjected to the following: written was obtained from all participants before beginning, after explaining the objective of the study, the type of operation, the possibility of complications, and the potential benefits.
Preoperative: Full history, Clinical examination and Investigations (Laboratory investigations, Radiology and All patients presented with mass were biopsied using tru-cut needle biopsy (14-gauge). Fine needle aspiration was used if cases presented with abscess).
Surgical treatment: Different surgical modalities including wide surgical excision, fistulectomy and extended excision with transfer of a random breast dermo-glandular flap (BDGF) were used according to the type of PDM.
BDGF is a pedicled flap containing the cutaneous, subcutaneous, and mammary gland tissues, which is nourished by a number of unnamed arterioles.
Mastectomy was used occasionally when the inflamed lesion involved nearly the whole breast or the remaining normal tissue after extended excision was not enough to resurface the breast tissue defect.

Ethical Consideration

Confidentiality: The confidentiality of all participants admitted to this study were protected to the fullest extent possible. The study participants were be identified by name in any report or publication resulting from data collected in this study.
Research statement: Ethical aspects whether substantial or procedural were implicated in thisstudy. Before participants are admitted in this study, the purpose and nature of the study as well as the risks were explained to the patients. The participants must agree that they understand the investigational nature of the study, its inherent risks and benefits, their rights to terminate their participation in this studywithout affecting their rights in having proper health care in the study site, whomto contact with questions regarding the study and that they are freely given an Written informed consent to participate in this study.
Written informed consent: The signed written informed consent form was a permanent part of the participant's study records and was maintained in the same manner as other records.
Data management and Statistical Analysis: Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) **(**Statistical Package for the Social Sciences) software for analysis. According to the type of data qualitative represent as number and percentage, quantitative continues group

represent by mean ± SD, the following tests were used to test differences for significance; correlation by Pearson's correlation or Spearman's.
P- value: level of significance: P > 0.05: Non-significant (NS), P < 0.05: Significant (S) and P < 0.01: Highly significant (HS).

RESULTS

Table 1: Distribution of the studied cases according to demographic data

	Cases (no=50)	
Age		
Range.	21 – 71	
Mean ± SD.	39.9 ± 15.5	
BMI		
Range.	23.2 – 32	
Mean ± SD.	27.82 ± 2.49	
Comorbidities		
Hypertension	9	18.0
Diabetes	2	4.0
HCV	9	18.0
Recurrence of PDM	6	12.0

This table shows that the mean age of studied cases was 39.9 (±15.5 SD) with range (21-71), the mean BMI was 27.82 (±2.49 SD) with range (23.2-32) and among the studied cases there were 9 (18%) with hypertension, 2 (4%) with diabetes, 9 (18%) with HCV and 6 (12%) with recurrence of PDM.

Table 2: Distribution of the studied cases according to Clinical presentations

Clinical presentation	**Cases (no=50)**	
	No.	%
Breast mass	47	94.0
Range.	0.6 – 8	
Mean ± SD.	4.61 ± 2.42	
Multiple lesions	4	8.0
Bilateral disease	6	12.0
Abscess	20	40.0
Nipple retraction	16	32.0
Rubefaction	13	26.0
Ductal fistulae	12	24.0
Skin ulceration	7	14.0
Duration of symptoms		
Range.	1.0 – 44.0	
Mean ± SD.	9.04 ± 8.78	

This table shows that according to Breast masses there were 47 (94%) with breast mases with mean size of 4.61 (±2.42 SD), there were 4 (8%) with multiple lesions and 6 (12%) with bilateral disease, there were 20 (40%) with abscess, 13 (26%) with rubefaction, 16 (32%) with nipple retraction, 7 (14%) with skin ulceration and 12 (24%) with ductal fistulae with mean duration of symptoms of 9.04 (±8.78 SD) and range (1-44) months.

Table 3: Distribution of the studied cases according to Lab investigation

Lab investigation	**Cases (no=50)**
Hemoglobin (Hb)	
Range.	11.0 – 13.7
Mean ± SD.	12.32 ± 0.68
White blood cells (WBCs)	
Range.	2.7 – 11.4
Mean ± SD.	6.74 ± 2.71
Platelets (Plts)	
Range.	107 – 344
Mean ± SD.	225 ± 77.03

This table shows that the mean **Hemoglobin** of studied cases was 12.32 (±0.68 SD) with range (11-13.7), the mean **White blood cells** cases was 6.74 (±2.71 SD) with range (2.7-11.4) and the mean **Platelets** was 255 (±77.03 SD) and range (107-344).

Table 4: Distribution of the studied cases according to outcome

Outcome	**Cases (no=50)**	
Duration of the operation (min)		
Range.	50.0 – 80.0	
Mean ± SD.	65.66 ± 9.14	
Duration of hospitalization (day)		
Range.	2.0 – 7.0	
Mean ± SD.	2.62 ± 0.99	
Clinical improvement	No.	%
Not improved	7	14.0
Improved	43	86.0

This table shows that the mean duration of the operation of studied cases was 65.66 (±9.14 SD) with range (50-80) minutes, the mean duration of hospitalization was 2.62 (±0.99 SD) with range (2-7) days and among the studied cases there were 7 (14%) who didn't improve and 43 (86%) who improved.

Table 5: Distribution of the studied cases according to complications

Complication	**Cases (no=50)**	
Early complications	No.	%
Bleeding	6	12.0
Infection	5	10.0
Late complications		
Abscess formation	5	10.0
Chronic mass	3	6.0
Recurrence of PDM	3	6.0

This table shows that according the early complications there were6 (12%) with bleeding and 5 (10%) with infection and according to late complications there were 5 (10%) with abscess formation, 3 (6%) with chronic masses and 3 (6%) with recurrence of PDM.

DISCUSSION

Periductal mastitis (PDM), first recognized as a "morbid condition of lactiferous ducts" by Birkett in 1850, is an inflammatory condition of the subareolar ducts. Bloodgood described duct dilatation and periductal inflammation as the pathological features in 1921 and recognized the disease as a distinct clinical entity 2 years later. In 1951, Zuska et al. described the true nature of this condition as mammary fistula and the disease was also called Zuska disease from then on. [7]

The etiology of the condition remains unclear. One of the major predisposing factors is obstructed lactiferous duct. The secondary infection of the inflamed obstructed ducts often leads to duct damage and subsequent rupture with abscess formation. It has been postulated to be associated with direct or indirect damage of the subareolar ducts, with tissue necrosis and subsequent infection. The breast concentrates substances in cigarette smoke; cotinine, a nicotine derivative, has higher concentrations in subareolar ducts than in plasma. [8]

Our data showed that the mean age of studied cases was 39.9 (±15.5 SD) with range (21-71), the mean BMI was 27.82 (±2.49 SD) with range (23.2-32) and among the studied cases there were 9 (18%) with hypertension, 2 (4%) with diabetes, 9 (18%) with HCV and 6 (12%) with recurrence of PDM

Liu et al.[8] The median age of patients at presentation was 34 (range 20–62) years, and the median age of controls was 34 (range 26–45) years. The median age did not differ significantly between the two groups. The majority of subjects in this study were married. There were no statistically significant differences between these two groups in terms of for the history of hypertension, type 2 diabetes mellitus, heart disease, or any history of allergy. Neither alcohol abuse nor active smoking was reported in the case and control groups. There was not any form of breast cancer in these patients of PDM confirmed by pathologic examination. [8]

However, in a descriptive, prospective study conducted by Saleem et al. Females with age range of 12 to 60 years were included, most of the patients were young with a mean age of 32.5 (SD=3.5) and BMI of 23.2 (SD= 1.4). [10]

Also, we found that according to Breast masses there were 47 (94%) with breast mases with mean size of 4.61 (±2.42 SD), there were 4 (8%) with multiple lesions and 6 (12%) with bilateral disease, there were 20 (40%) with abscess, 13 (26%) with rubefaction, 16 (32%) with nipple retraction, 7 (14%) with skin ulceration and 12 (24%) with ductal fistulae with mean duration of symptoms of 9.04 (±8.78 SD) and range (1-44) months.

In the study of Zhang et al. [7] a periareolar mass was the most frequent symptom. The most common clinical manifestations were mass (98.0%), rubefaction (41.4%), nipple retraction (36.8%), abscess (36.8%), skin ulceration (25.7%), and mammary duct fistula (19.1%). The size of the mass ranged from 0.6 to 11 cm with a mean of 3.8 cm. Twelve (7.9%) of patients had bilateral involvements synchronously or asynchronously and four (2.6%) patients had multiple lesions at hospitalization. Fourteen (9.2%) patients were recurrent PDM at first hospitalization. [7]

Liu et al. reported that most patients had unilateral breast disease, with only 8 patients exhibiting bilateral symptoms. Breast mass with or without pain was the most common complaint. The median duration between last pregnancy and onset of PDM was 5 years (range 1–35 years), which implied that that reproductive age might relate to PDM to some degree. [9]

Moreover, we found that the mean Hb of studied cases was 12.32 (±0.68 SD) with range (11-13.7), the mean WBCs cases was 6.74 (±2.71 SD) with range (2.7-11.4) and the mean PLTs was 255 (±77.03 SD) and range (107-344).

WBC, and neutrophil to lymphocyte ratio (NLR) values were significantly higher in BA and IGM groups compared with the control group (for all parameters $p<0.001$). Furthermore, when BA and IGM groups were compared, while a significant difference was found in WBC between these groups ($p=0.042$), no difference was found for NLR ($p=0.081$, respectively). [11]

Our results revealed that the mean duration of the operation of studied cases was 65.66 (±9.14 SD) with range (50-80) minutes, the mean duration of hospitalization was 2.62 (±0.99 SD) with range (2-7) days, while **Saleem et al., 2020** reported that the average operative time was 43.4 min and the average postoperative duration of hospitalization was 2.7 ± 2.1 days. Moreover, among the studied cases there were 7 (14%) who didn't improve and 43 (86%) who improved.

Regarding the early complications there were 6 (12%) with bleeding and 5 (10%) with infection similar to **Saleem et al., 2020** reported there were 11.2% case of infection formation However, no case of mortality, postoperative bleeding and according to late complications there were 5 (10%) with abscess formation, 3 (6%) with chronic masses and 3 (6%) with recurrence of PDM, similar to (**Yabanoğlu et al., 2015**) that showed the recurrence rate 11.7%

Complicated periductal mastitis is a distinct benign breast condition of unknown etiology. Mass, abscess, fistula and nipple retraction are most common manifestations of the disease. Wide surgical excision, fistulectomy and extended excision with transfer of a random breast dermo-glandular flap (BDGF) are effective surgical modalities for different type of PDM. [7]

CONCLUSION

Mass, abscess, fistula and nipple retraction are most common manifestations of the disease. Wide surgical excision, fistulectomy and extended excision with transfer of a random breast dermo-glandular flap are effective surgical modalities for different types of PDM.

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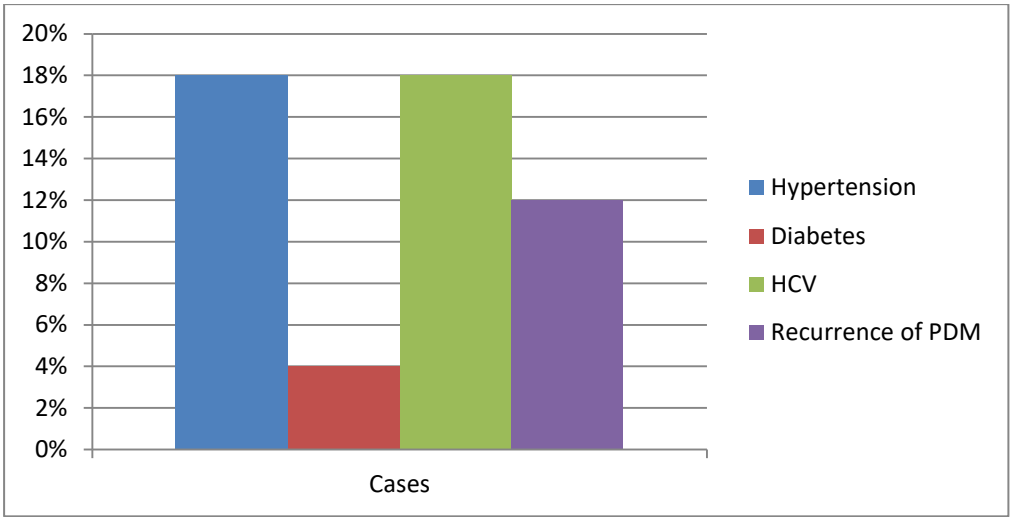

Figure 1: Distribution of the studied cases according to comorbidities

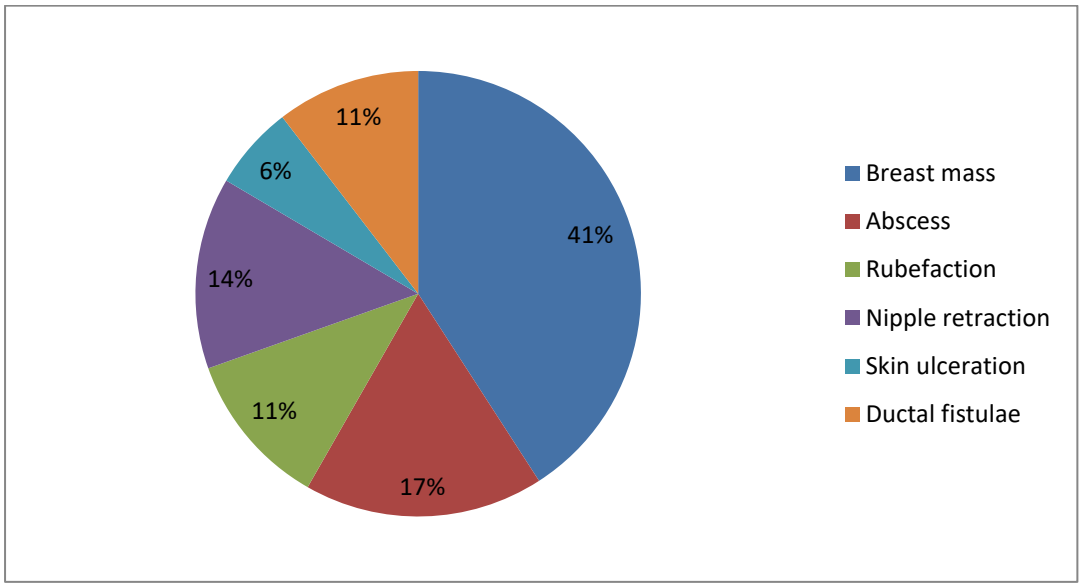

Figure 2: Distribution of the studied cases according to Clinical presentations

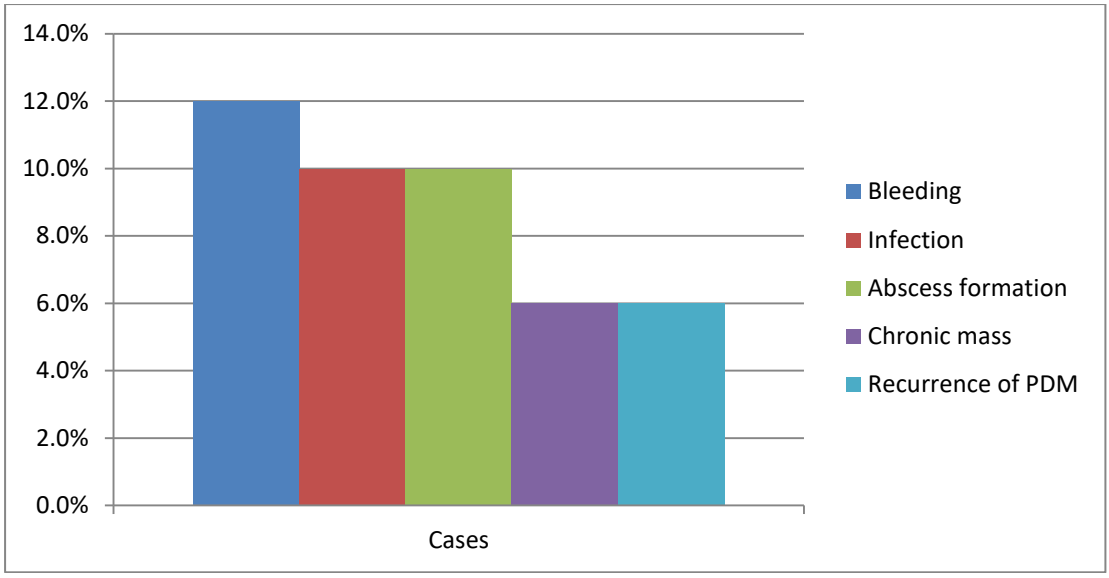

Figure 3: Distribution of the studied cases according to Clinical presentations

Figure 4: a case presented with right breast sinus and fistula

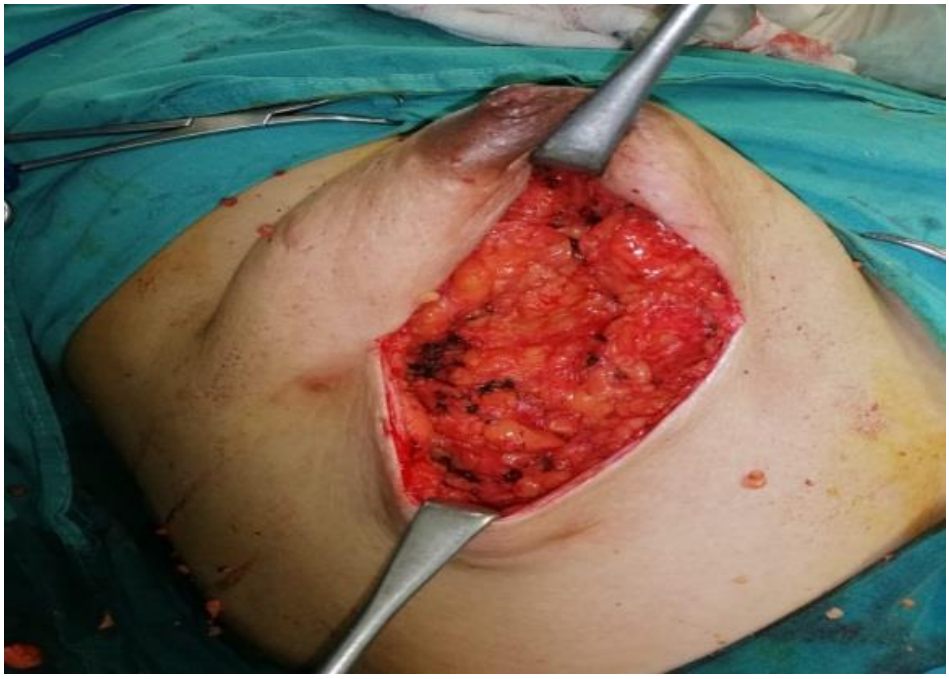

Figure 5: Intra-operative image, showing the normal tissue after excision of the mass

Figure 6: immediately post-operative image, showing the incision after closure

Figure 5: pre-operative image, showing multiple sinuses with skin damage

Figure 6: post-operative image, showing the excised mass

Figure 7: Immediately post-operative wound closure

Figure 8: pre-operative image, shows another case with multiple sinuses with skin damage

Figure 9 : intra-operative image, shows remaining healthy tissue after excision of the mass