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Original Article

COMPLICATIONS OF LEVEL I AND II AXILLARY DISSECTION IN THE TREATMENT OF CARCINOMA OF THE BREAST

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Abstract

Background: The role of axillary dissection as an effective means of controlling regional nodal disease, has long been recognized. It is associated with significant complications and might be more selectively applied only to patients harboring micrometastases to the sentinel nodes.

Objective: To assess the complications of level I and II axillary lymph node dissection in the treatment of stage I and II breast cancer, with mastectomy.

Methods: One hundred patients having total mastectomy with axillary dissection, were evaluated for more than 1 year after surgery for arm swelling as well as non-edema complications. All patients had measurements of circumference of upper limb at 4 sites on both the operated and non operated sides.

Results: No patient had an axillary recurrence, difference in circumference of upper limb at the midbiceps level >2 cm – 13% (p <0.001), difference at the antecubital fossa>12% (p < 0.001), at the mid forearm>2cm – 8% (p < 0.005), and at the wrist 4% (n.s.). Four patients (4%) had mild swelling of the hand. Seventy seven (77%) patients had numbness or paresthesias of the medial arm and/or axilla after surgery; in 63 (82%) of these, the problem had lessened or had resolved on follow-up assessment.

Medical therapy with anti-tubercular drugs ranging from 9 to 12 months with follow up monthly was the mainstay of treatment. Surgical intervention reserved for selected refractory cases. Extension of anti-tubercular therapy from 9 to 12 or 18 months required in fifty-eight(58) patients on the basis of slow clinical response. Complete resolution obtained in 92 patients but residual tiny mass in eight patients confirmed by repeated FNAC to be fibrotic.

Conclusion: Level I and II axillary dissection is associated with various complications. Sentinel lymphadenectomy may be proposed as an alternative to elective axillary dissection.

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Introduction

The role of axillary dissection in the treatment of invasive breast cancer has come under particular scrutiny in recent years as its impact on survival has been questioned[1]. It might be more selectively applied only to patients harboring micrometastases to the sentinel nodes[2]. Since originally being described as a component of the radical mastectomy, axillary dissection for breast cancer persisted with modifications of the radical mastectomy.

As breast-conserving procedures became accepted, and as additional data on the distribution of nodal micrometastases accumulated, the extent of elective axillary dissection was often modified. The incidence of level III micrometastases in the absence of level I or II metastases was found to be 1% or less[3]. Although the incidence of isolated metastases to level II was still <2% in some series, the incidence of "skip" metastases did exceed 20% in otherreports[4]. As a result, level I and II dissection, with preservation of the pectoralis minor, has come to represent the anatomic extent of axillary lymphadenectomy in most reports[5].

To assess the complications of a level I and II axillary lymph node dissection, we evaluated the surgical, cosmetic and functional consequences in 100 patients consecutively seen in follow-up evaluation >1 year after surgery for stage I or II breast cancer. All axillary dissections followed a uniform surgical protocol.

Materials and Methods

One hundred patients were consecutively evaluated afte rsurgical treatment for unilateral breast cancer that included a level I and II axillary dissection. All of these patients' postoperative surveillance protocols included evaluation clinically by the surgeon every 3 months during the first 2 years after surgery, with more extended intervals beyond that but never exceeding 6 months. Only patients seen for the first annual examination or beyond were included in this analysis

Operative method

The axillary dissection was begun by defining the lateral edge of the pectoralis minor and the medial pectoral nerve branches and vessels, and incising the clavipectoral fascia parallel to the lateral edge of the pectoralis minor muscle. The clavipectoral fascia was further incised laterally, thereby exposing the lympho-adipose contents of the axilla. A concentrated effort to dissect all the soft tissue off the brachial plexus and the adventitia of the axillary vein was avoided. The medial pectoral nerve and vascular bundle lateral to the pectoralis minor muscle were protected.

In dissecting subjacent to the pectoralis minor muscle, the forearm was supported in a position directed toward the contralateral side and parallel to the patient, thereby facilitating medial retraction of the pectoral muscles. All branches of the axillary vein were divided and ligated from the level of the thoraco-acromial vessels. Posteriorly directed subscapular vessels were not ligated. The inferior axillary contents were dissected off the serratus anterior fascia. The intercostobrachial nerve was ligated as it exited from the second intercostal space, although in the more recently treated patients it was often preserved. The long thoracic nerve and the thoracodorsal nerve and vessels were preserved and the axillary contents further dissected to the edge of the latissimus dorsi and the lateral extent of the axillary vein, where the specimen was transected.

All axillary dissections were drained using a closed suction system. Drains were kept in place for 4 to 5 days, at which time serous drainage was invariably <50 cc per 24hours. Antibiotics were begun before the incision and maintained until the drain was discontinued.

All patients were instructed in arm care and lymphedema precautions. All were given range-of-motion exercises after drain removal and an absence of seroma formation.

Lymphedema was assessed by measuring both arms at the same site in the midbiceps region, the antecubital fossa, the midforearm, and the wrist. Hand swelling was rated as nonexistent, minimal, or significant. All patients were carefully assessed for axillary recurrence throughout the follow-up examinations.

Non lymphedema complications were monitored by use of a standardized interview protocol to elicit specific complaints. Range of motion was assessed by the surgeon as active ranging at the shoulder joint, which was scored as equal to or decreased relative to the non operated side. Numbness and paresthesias were evaluated by standard questions asked of each patient regarding the location and severity of the symptoms at the time of evaluation and compared with those in the postoperative period (unchanged, improved, significantly improved, or completely resolved).

Results: one hundred patients were evaluated with a median follow-up time of 38.5 months (range 12.3 to 159.3 months).

Table 1: Clinical And Pathologic Characteristics (n = 100)

Median fol low -up	38.5 months (range 12.3–159.3)
Median age	50 years (range 35–75)
Body habitus	Thin 25 (25%) Normal 60 (60%) Heavy 15 (15%)
Intercurrent disease	Cardiac 6 (6%) Diabetes 5 (5%)
Laterality	Right breast 52 (52%) Left breast 48 (48%)

There was no recurrent axillary disease in any patient within the follow-up period. Fifty seven patients who underwent mastectomy had chest wall irradiation.
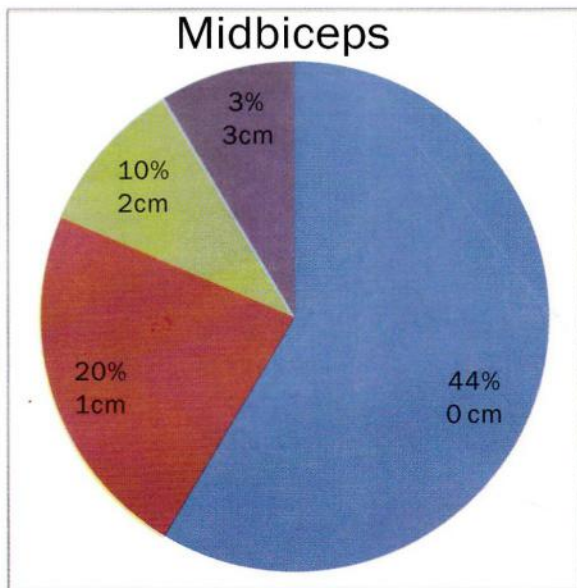
Midbiceps

Figure 1. Percentage distribution of difference in circumference (cm) between operated and nonoperated arms at midbiceps .

Antecubital crease

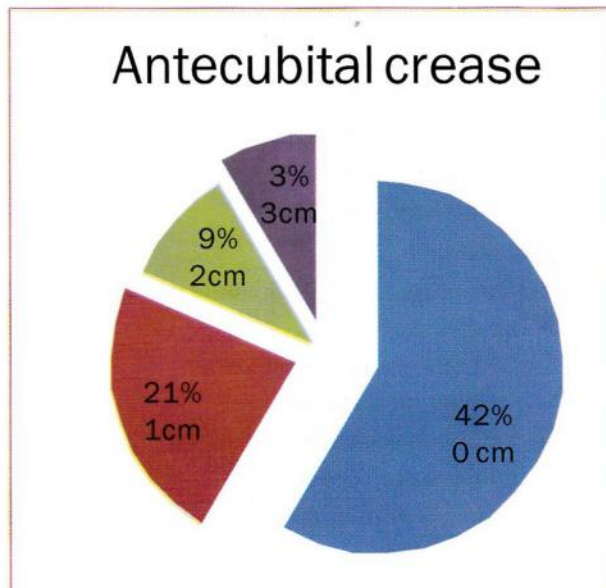**Figure 2.** Percentage distribution of difference in circumference (cm) between operated and nonoperated arms at antecubitalcrease .

Midforearm
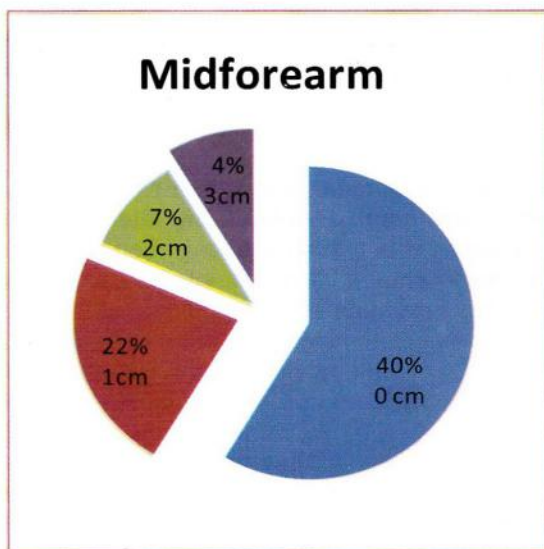

Figure 3. Percentage distribution of difference in circumference (cm) between operated and nonoperated arms at midforearm .
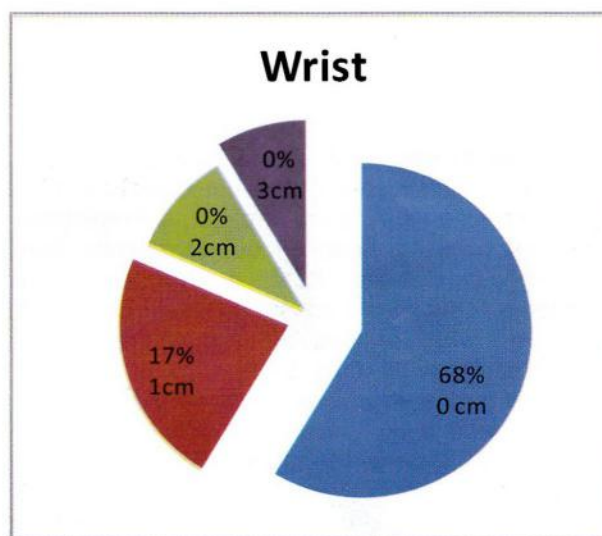
Wrist

Figure 4. Percentage distribution of difference in circumference (cm) between operated and nonoperated arms at wrist.

Table 2. Edema and cell ulitis

Differe nce in arm circumference> 2 cm	13 (13%)
Difference in antecubital fossa circumference >2cm	12 (12%)
Difference in forearm circumference >2 cm	8 (8%)
Hand swelling	None 96(96%)
	Minimal 4(4%)
	Significant 0 (0%)
Arm infections (cellulit is) requiring antibiotics	One instance 3(3%)
	Two instance 1 (1%)
	Three instance 1(1%)

Table 3.   Nonlymphedema complications

Postoperative wound infection	20 (20%)
Seroma after dra in removal requiring aspiration	45 (45%)
Prolonged pain , early postoperative period	3(3%)
Pain in follow up evalution	0 (0%)
Winged scapula	0 (0%)
Numbness or paresthesias in early postoperative	
None	23 (23%)
Numbness or paresthesias:	77 (77%)
Upper medial arm only	7 (7%)
Upper medial arm and axilla	42(42%)
Axilla only	28(28%)
Improvement in follow - up of numbness or paresthesias	
Unchanged	14/77 (18%)
Less	14/77 (18%)
Much less	32/77 (42%)
Completely resolved	17/77 (22%)
Recurrent axillary disease	0 (0%)

Discussion

The most commonly cited source of complications after axillary dissection is lymphedema. Our results demonstrate an objective difference in arm circumference at a single site of >2 cm in 13% of patients, not dissimilar to the incidence of 16% noted by Lin et al[6] in a more heterogeneous group of patients. Predictably, heavy and obese patients in our experience were more likely to develop swelling. Because of the infrequency of significant edema in our clinical experience, we relied exclusively on circumferential measurements at multiple sites.

Recently reported incidences of lymphedema after axillary dissection demonstrate a wide range, from 5% to25.5%[7]. Seroma formation was common, in our experience. A collection of serum and lymph is to be expected afteraxillary dissection[8].Despite postoperative closed suction drainage to minimize prolonged seroma formation, 45% of patients required seroma aspirations after the discontinuance of a drain. However, no patient had a postoperative infection or prolonged and excessive seroma formation requiring reinsertion of a closed suction drain.

No patient in our series had any range-of-motion limitation. Reports in the literature have assessed the influence of shoulder exercises on seroma formation after axillary dissection performed[9].No apparent adverse effect has been observed from early arm mobilization. With suction drainage in place, we have advised only modest mobility of the arm to minimize stiffness and the risk of a frozen shoulder if immobility is prolonged.

Pain after axillary dissection is difficult to assess in the immediate postoperative period. Although 5% of patients reported pain requiring analgesia beyond the immediate postoperative period, no patient seen in follow-up noted pain requiring analgesia attributable to the axillary dissection. No patient had a winged scapula.

Numbness or paresthesias to the skin of the upper medial arm and/or axilla from intercostobrachial nerve sacrifice or injury have long been recognized[10]. In our experience, 77% of patients had such changes in the initial postoperative period, but with prolonged follow-up complete resolution was achieved in 22%, and the problems were improved in an additional 60%. This experience is similar tothat reported by Salmon[11].

Elective axillary dissection clearly provides significant prognostic information, but greater selectivity in the performance of the procedure is coming under closer scrutiny as the frequency of smaller, often non palpable and low-grade cancers rises as a result of more widespread mammographic screening[12]. Sentinel lymphadenectomy has been proposed as an alternative to elective axillary dissection. In reported series to date, sentinel node biopsies have most often been followed by completion axillary dissection[13].

Conclusion

Sentinel node biopsy allows a more exhaustive assessment of the sentinel node for micrometastasis. Whether sentinel lymphadenectomy will eliminate elective axillary dissection from the surgical treatment of breast cancer remains to be demonstrated.

Introduction

Primary breast TB is a rare form of extra-pulmonary TB, with an incidence of less than 0.1% of all breast lesions in Western countries and 4% of all breast lesions in higher TB endemic countries like the Indian subcontinent[1]. The first case of mammary tuberculosis was reported in 1829, by Sir Astley Cooper as 'scrofulous swelling of the bosom[2]. Since then few case reports and reviews have been published at infrequent intervals mostly in western literatures and few studies have published in various papers of the subcontinent. Bangladesh ranks 6th among the 22 high TB burden countries, 3 but breast tuberculosis is very rarely reported. Despite the encouraging worldwide progress in concerted preventive program on tuberculosis, global tuberculosis burden recently has increased in many industrialized countries due to increased number of immunocompromised and AIDS patients. As incidence of tuberculosis increase, an increase in extra pulmonary involvement can be expected[4]. The incidence, clinical presentation, diagnostic tools and therapeutic modalities of breast tuberculosis has been gradually changing due to changes in the environment and socio-economic conditions. So study of cases of mammary tuberculosis is necessary to acclimatize with the changing clinical patterns and newer therapeutic approaches.

Methods

This is a prospective non randomized descriptive study. A total of 100 consecutive TB Mastitis patients of Chest disease Hospital, Rajshahi were enrolled in this study within a period of 04 years from July 2012 to July 2016. Photograph of breast with academically interesting lesion were taken for printing and publication purpose which was clearly explained to the patients and permission were taken. Data for each patient were recorded. Detail clinical information including age, socioeconomic status, reproductive history, lactational status, clinical presentations, duration of symptoms, previous history of pulmonary or extrapulmonary TB, contact with TB patients and findings of relevant investigations like ESR, mantoux test and chest radiogram were recorded for all patients in a predesigned data record sheet. The inclusion criteria for the study were - adult female patients, had breast lump/s sinus/s or abscess/s and whose diagnosis were confirmed as mammary tuberculosis on the basis of clinical suspicion and cytological or histological findings of epitheloid granuloma. Male patients, patients below the age of 12 years and patients who had concomitant pulmonary or extra pulmonary TB were excluded from the study.

Diagnoses were made by clinical suspicion and presence of chronic granulomatous inflammation consisting of caseation necrosis, epitheloid cell and Langhans giant cell in the cytological or histopathological slide prepared from the collected specimen. For detection of acid fast bacilli discharge (if scanty) is sent for Z-N staining and when discharge or pus more or about two (2) ml sent for Gene x-pert test. FNAC were done initially for all suspected TB mastitis patients who had lump/s but no abscess or sinus. Cases with abscess or sinus with or without underlying lump had directly undergone core cut biopsy or open biopsy on the basis of clinical judgement.

A nine months regimen of four drugs anti -tubercular therapy were given to all patients in combination with surgical intervention in the form of lumpectomy, incision drainage or sinectomy as necessary. The doses of drugs and duration of therapy were adjusted depending on the weight of the patient and clinical response to therapy respectively. A short course of flucloxacillin was given to those patients who needed surgical intervention.

Results

Table 1: Age specific distribution of the patients (n=100)

Age range (years)	No of patient	Percentage (%)
< 20	03	03
21-30	49	49
31-40	27	27
41-50	14	14
51-60	05	05
> 60	02	02
Total	100	100

Table 2: Clinical presentation at study entry of mammaryTuberculosis (n=100)

Clinical presentation	Right	Left	Bilateral	Total no	Percentage
Multiple sinus/s with underlying breast lump	20	11	01	32	32
Breast lump with abscess	06	04	00	10	10
Abscess drainage scar with lump	18	12	00	30	30
Lump Only	07	11	00	18	18
Discharging sinus/s with no lump	02	00	00	02	02
Discharging sinus/s with abscess	03	05	00	08	08
Total	56	43	01	100	100

Table 3: Additional clinical information

Clinical information	No	Percentage
Previous History of TB (PTB/EPTB)	03	03%
Lactating at the time of presentation	01	01%
Nulliparous	13	13%
Postmenopausal	12	12%
Constit utional symptoms	09	09%
Axillary lymphadenopathy	23	23%
Pregnancy at the time of Presentation	03	03%
History of contact with TB patient	03	03%

Table 4: Anatomical distribution of lumps
in the breast (n=100)

Anatomical sites in breast	No	Percent (%)
Upper and outer quadrant	56	56
Upper and inner quadrant	1	1
Lower and outer quadrant	21	21
Lower and inner quadrant	03	03
Central sub areolar area	19	19
Total	100	100

Table 5: Distribution of patients depending on
investigations Modalities (n=100)

Investigation modalities	No of patient sent	Percentage	Positive Result
Chest radiogram	100	100%	Old PTB (03 cases)
ESR	100	100%	Raised (90 cases)
Mantoux test	100	100%	Positive (15 cases)
FNAC	100	100%	Positive (100 cases)
Open biopsy - a)Excision of lumps including sinus	06	6%	Positive (06)
b)Incision and drainage + incision biopsy	21	21%	Positive (21)
from abscess wall	05	05%	Positive(05)
	04	04%	Positive(04)
d)Excision of the mass			
e)Wedge excision from the mouth of the sinus			
Core cut Biopsy	30		
USG of Breast	100		
Ziehl - Neehlson stain	21		
ICT for TB (from pus)	21		
Gene Xpert test (From pus)	21		

Table 6: Therapeutics modalities of Mammary Tuberculosis (n=100)

Therapeutic modalities	No	Percentage (%)
Excision of the lump + ATT	05	05
Excision of mass + Sinectomy + ATT	06	06
Incision drainage of abscess +ATT	21	21
ATT Only	68	68
Total	100	100

Table 7: Duration of ATT

Duration	No of patients
9 months	42
12 months	52
16 months	05
18 months	01

Picture 1: Tubercular breast abscess

Picture 2: Tubercular mastitis with ch discharging sinus

Discussion

Breast tissue remarkably resistance to the survival and multiplication of the tubercle bacillus like spleen and skeletal muscle[4]. Breast TB may be primary when no demonstrable tuberculosis focus exists, or secondary to a lesion elsewhere in the body[5].

here are three recognized modes of spread of the tubercle bacilli to the breast: direct, lymphatic and Haematogenous[6]. Primary infection of the breast may occur through skin abrasions or through the duct openings on the nipple. Dilated ducts of the breast in pregnant and lactating women appear to be especially susceptible to infection. In our series three (3) pregnant and one (1) women were lactating at presentation .Direct extension from the contiguous ribs is another possible mode of infection. However it is generally believed that infection of the breast is usually secondary to a tuberculosis focus elsewhere which may not be clinically or radiologically apparent. Such a focus could be pulmonary or a lymph node in the internal mammary or axillary group[7].

Three forms of breast tuberculosis nodular, disseminated, and sclerosing, have been described[8]. Nodular pattern may be mistaken for a fibro adenoma or carcinoma.The disseminated form frequently leads to caseation and sinus formation. We observed 42 out of 100 patients had sinus formation almost nearer to that reported by Khanna et al(26 out of 52)[9]. Sclerosing tuberculosis generally appears in older women. Mammary tuberculosis is a disease of younger age group; uncommonly an older patient may present with a mass that mimics carcinoma, whereas the younger patient usually manifests sign of a pyogenic breast abscess.

According to Hamit[10] in 60 per cent of cases it may not be possible to recover acid fast bacilli from any site, but the breast. Acid fast bacilli were recovered from only in 2 cases in our series, an incidence similar to that reported by Morgen[11]. In 1829, Cooper postulated that the breasts get secondarily involved by retrograde lymphatic extension from primary foci of disease in the lymph nodes of the mediastinum, axilla and parasternal and cervical region[12]. Supporting this hypothesis is the fact that axillary node involvment occurs in 50 to 75 per cent of cases of tuberculosis mastitis. In our series same side axillary lymph node involvment was present in 23 cases (23%).

Both breasts can be affected equally but bilateral involvement is very uncommon. In our study fifty six (56) involved right breast, forty three (43) left breast and bi-lateral involvement was in only one (1) case. Although the upper-outer quadrant seems to be the most frequently involved site due to its proximity to the axillary nodes, any area of the breast can be affected. Early diagnosis is difficult, as the characteristic sinuses occur late in the course of the disease. In addition, presence of these sinuses is not the distinctive feature of tuberculosis, as several cases of non-tuberculosis granulomatous mastitis also present with sinuses. However, tuberculosis should be suspected in a patient who has a recurring breast abscess after adequate drainage on previous occasions.

Various tests are useful in the diagnosis and further evaluation of patients with breast tuberculosis. Mantoux testing does not offer definitive diagnosis, but confirms exposure of the patient to tubercle bacilli. In this series only fifteen patients (15) was Mantoux positive. Mammography is not helpful, especially in young women, due to high density of the breast tissue. On the other hand, mammography findings in elderly women are generallyindistinguishable from breast carcinoma. At ultrasonography, a hypoechogenic mass is found in 60% of patients and the methodmay sometimes identify a fistula or a sinus tract which can be seen in cases of tuberculosis mastitis. Computed tomography andnuclear magnetic resonance are used to evaluate the extension of the lesion beyond the breast, principally towards the thoracicwall.

The gold standard for the diagnosis of breast tuberculosis is detection of M. tuberculosis by Ziehl Neelsen staining or by culture. Fine needle aspiration cytology may not be able to detect the responsible pathogen itself, but is detecting the presence of epithelioid cell granulomas and necrosis, leading to definitive diagnosis in up to 73% of cases. Polymerase chain reaction (PCR) is highly sensitive for the diagnosis of breast tuberculosis. Finally, histopathology of the lesion identifies a chronic granulomatous inflammation with caseous necrosis and Langhanstype giant cells, contributing to diagnosis in the majority of the cases. In our series aspirated pus or discharge sent for Gene xpert test (PCR based test), ICT and Z-N staining but it was positive in only twenty one (21) ceses. The principal differential diagnosis is that of breast carcinoma.

Before the discovery of anti-tuberculosis drugs, surgeons performed mastectomies to treat mammary tuberculosis. Wilson and MacGregor[12] recommended simple mastectomy for most cases, due to development of local recurrence in three of their five patients following less severe procedures. However, today the combination of drug therapy and limited excision of diseased breast tissue is a method of choice. In our series, anti-tubercular chemotherapy was given to all cases. In thirty two (32) cases it was given in combination with excision of necrotic tissue and drainage of abscess. The rate of surgical intervention is lower in our series than that of khanna et al (24 out of 52). Follow up done monthly up to complete resolution and extension of ATT needed highest 18 months. Complete resolution observed in ninety two (92) patients and residual tiny lumpiness in rest eight (8) patients confirmed by repeated FNAC as fibrotic. Most of our cases presented to us long after the development of their first symptoms and due to this delay at presentation the lesion had already been complicated by abscess or sinus formation for which surgical intervention were mandatory. The cause of this late presentation was probably due to conservative social customs, ignorance and poverty.

Conclusion

As it is not an uncommon entity in our daily practice, tuberculous mastitis should be kept in mind for differential diagnosis in patients who have no response to standard non tubercular antibiotic therapy with chronic breast infections including recurrent breast abscess or breast lump mimicking carcinoma of breast.

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