

Assessment of quality of operable breast cancer care in a tertiary care hospital in northwestern Tanzania: a single institution experience

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Abstract:

Background: Breast cancer and its treatment constitute a great challenge in resource limited countries as found in Africa. This study was conducted to assess the quality of operable breast cancer in our setting and compare with the international standards.

Methods: This was a retrospective study of histologically confirmed breast cancer patients seen at the department of Surgery of Bugando Medical Centre from January 2004 to December 2013. The details of patients were obtained using data derived prospectively from and also from patients' files kept in the Medical Record Department, the surgical wards, operating theatre and histopathology laboratory. The study variables included demographic data, menopausal status, duration of illness, preoperative diagnosis, tumor size, pathological nodal status, clinical stage, histopathological type and grade, and treatment modalities. This information was collected using a pre-formed questionnaire.

Results: A total of 374 patients were studied. The median age at diagnosis was 48 years (range 18- 84 years). Pre-operative bilateral mammography was performed in 56 (14.9%) and fine needle aspiration cytology in 221 (59.0%) patients. Triple assessment before definitive surgery was performed in only 42 (11.2%) patients. Excisional biopsy was performed in 214 (57.2%) patients. Complete pre-operative staging according to AJCC was performed in 289 (77.3%) patients. Definitive surgical procedure was performed in 372 (99.5%) patients, of which 366 (98.4%) patients had mastectomy. Axillary dissection was performed in 224 (65.5%) patients. None of our patients had sentinel node biopsy performed. The tumor size, histopathological grade, margins of excision, and the total number of nodes removed were recorded in 158 (42.5%), 308 (82.4%), 69(18.5%) and 198 (53.2%) patients respectively. Histopathological type was reported in all patients (100%). Estrogen receptor and progesterone receptor status was not reported in all patients. Adjuvant chemotherapy and hormonal therapy were given in 59 (42.8%) and 208 (55.6%) patients respectively.

Conclusion: This study demonstrated that the quality of breast cancer care in this institution was below the accepted international standards. This study may be used to make interventions for improvement of quality of breast cancer care in this part of Tanzania and in similar institutions in resource limited countries.

Keywords: assessment of care, breast cancer, health care quality, quality assessment, Tanzania

Introduction

Breast cancer constitutes a major public health issue globally with over 1 million new cases diagnosed annually, resulting in over 400,000 annual deaths and about 4.4 million women living with the disease (Parkin *et al.*, 2005). It is the commonest site specific malignancy affecting women and the most common cause of cancer mortality in women worldwide (Parkin *et al.*, 2005). The incidence of breast cancer has been reported to be higher in the developed countries than in the developing countries and Japan (Vorobiof *et al.*, 2001; Ikpat *et al.*, 2002). In Africa, breast cancer has overtaken cervical cancer as the commonest malignancy affecting women and the incidence rates appear to be rising (Vorobiof *et al.*, 2001; Omar *et al.*, 2003). In Tanzania,

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breast cancer constitutes the second leading cause of cancer incidence and mortality for women (Ngoma & Mtango, 2002), and the lifetime risk for developing breast cancer in Tanzania like in most developing countries is approximately 1 in 20 (Parkin, 2003).

Breast cancer and its treatment constitute a great challenge in resource limited societies as found in Africa. The hallmarks of the disease in Africa are patients presenting at advanced stage, lack of adequate mammography screening programs, preponderance of younger premenopausal patients, and a high morbidity and mortality (Vorobiof *et al.*, 2001; Adesunkanmi *et al.*, 2006). The results of prevention of breast cancer or breast cancer cure have not been very encouraging more so in the developing countries (Gakwaya *et al.*, 2008). The present day knowledge of this disease does not have any effective primary prevention. It is thus imperative that efforts should be made to detect the disease in its early stages. Mammography has been found to be useful but it is not feasible for mass screening in most developing countries as there is a limited number of units accessible to the general public (Ngoma & Mtango, 2004).

The quality of breast cancer care, defined as 'the degree to which health services for individuals and populations increase the likelihood of the desired outcomes and are consistent with current professional knowledge'; is a matter of concern both for the care providers and the health care recipients (Lohr, 1990; Chassin & Gavin, 1998, McGlynn *et al.*, 2003). Process quality, which refers to what health care workers do, and how well they do it, both technically as well as interpersonally, is commonly used to assess the quality of care. Particularly the quality of the technical process is measured, which refers to whether the right choices are made in diagnosing and treating the patient and whether care is provided in an effective skillful manner. Obviously the best process measures are those for which there is evidence from research that a better process leads to an improved outcome (Hewitt & Simone, 1999).

During all phases of continuum of breast cancer care, an association between the process and outcome is supported by extensive scientific literature including many randomized trials, meta-analyses, and international guidelines (Early Breast Cancer Trialists' Collaborative Group, 1992; Eastman., 1997; Early Breast Cancer Trialists' Collaborative Group, 1998; Goldhirsch *et al.*, 1998). It therefore provides an excellent opportunity to assess the quality of care among this group of oncological patients.

The quality of care of breast cancer patients may be poor in resource limited setting like ours due to late presentation of the disease, lack of adequate mammography screening programmes, lack of well trained cytologist to perform the FNAC and poor access to adjuvant therapy. This study was conducted to assess the quality of operable breast cancer in our setting and compare with the international standards.

Materials and Methods

Study design and setting

This was a retrospective study of histologically confirmed breast cancer patients seen at the department of Surgery of Bugando Medical Centre (BMC) from January 2004 to December 2013. BMC is a consultant, tertiary care and teaching hospital for the Catholic University of Health and Allied Sciences-Bugando (CUHAS-Bugando) and has 1000 beds. The hospital is located in Mwanza in north-western Tanzania and serves as a referral centre for tertiary specialist care for a catchment population of approximately 13 million people from neighboring regions. The hospital has a newly established Oncology Department which provides care for all patients with histopathologically proven cancers including breast cancers. However, the department does not currently provide radiotherapy services. As a result patients requiring radiotherapy have to travel long distances to receive this modality of treatment elsewhere.

Study population

The study population included all patients who presented to BMC with histologically confirmed breast cancer during the period of study. Patients with incomplete data were excluded from the study. The details of patients were obtained using data derived prospectively from BMC medical record database (2004-2013) and also from patients' files kept in the Medical Record Department, the surgical wards, operating theatre and histopathology laboratory. The study variables included demographic data, menopausal status, duration of illness, preoperative diagnosis, tumor size, pathological nodal status, clinical stage, histopathological type and grade, and treatment modalities. This information was collected using a pre-formed questionnaire.

To study the quality of care in this group of patients, indicators proposed by the National Cancer Policy Board (Hewitt & Simone, 1999) and Hillner *et al.* (1997), were used. In addition, standards of practice outlined in various guidelines and reviews were utilized to assess other parameters of breast cancer care (Table 1) (Mandelblatt *et al.*, 1999; Hewitt & Simone, 1999; Akhtar & Nadrah, 2005).

The quality of fine needle aspiration cytology was assessed by dividing our patients into two groups: those whose diagnosis was established by this procedure and others who needed a subsequent core or excision biopsy before a definitive surgical procedure due to non-diagnostic aspiration cytology. The accuracy of clinical examination, mammography, and fine needle aspiration cytology increases when they are used together; a procedure called triple assessment or triple diagnosis. When the results of all the components of triple assessment indicate a benign lesion, cancer will be found in less than 0.5% of cases. On the other hand if all three indicate cancer the diagnosis is likely to be confirmed in more than 99% of cases histology (Kaufmann *et al.*, 1994; Mande *et al.*, 2004; Chalya *et al.*, 2013). The size of the tumor was abstracted from the pathological, surgical, or clinical record of the patient, whichever was available. When all three were documented pathological size took precedence.

Pre-operative staging was considered complete if the patient had a chest X-ray, liver function tests, abdominal ultrasound, and a computerized tomography scan. Clinical and pathological staging information was additively utilized to identify the stage of disease according to the American Joint Committee for Staging (AJCC) classification (AJCC Cancer Staging Manual). We reviewed the histopathological reports of all the biopsies as well as post-operative specimens of those patients who had a definitive surgical procedure. Table 1 shows the criteria used to evaluate the quality of histopathological reporting.

Data analysis

Statistical data analysis was done using SPSS software version 17.0 (SPSS, Inc, Chicago, IL, USA). Data was summarized in form of proportions and frequency tables for categorical variables whereas continuous variables were summarized using median and ranges.

Ethical consideration

Ethical approval to conduct the study was obtained from the CUHAS/BMC Joint Institutional Ethic Review Committee before the commencement of the study.

Results

Patient's characteristics

During the period of study, a total of 389 patients with histopathologically proven breast cancer were managed at our centre. Of these, 15 patients were excluded from the study due to incomplete data. Thus, 374 patients were studied. The median age at diagnosis was 48 years (range 18- 84 years). A total of 198 (53.0%) were aged 50 years and below. Two hundred and two (54.0%) patients were pre-menopausal and the remaining 172 (46.0%) patients were post-menopausal.

Pre-operative diagnosis

Pre-operative bilateral mammography was performed in 56 (14.9%) and fine needle aspiration cytology in 221 (59.0%) patients. Triple assessment before definitive surgery was performed in only 42 (11.2%) patients. Excisional biopsy was performed in 214 (57.2%) patients and 67 (17.9%) patients had this procedure done after inconclusive results of fine needle aspiration cytology. Complete pre-operative staging according to AJCC was performed in 289 (77.3%) patients. Majority of patients, 198(68.5%) at the time of diagnosis had T3 tumors and most of them, 176 (60.9%) had clinical stage III tumors.

Definitive surgical treatment

Definitive surgical procedure was performed in 372 (99.5%) patients. Of these, 366 (98.4%) patients had mastectomy and the other six (1.6%) had only lumpectomy. Two (0.5%) patients refused surgery and requested referral to other centers near their home place. No follow up data was available to these patients. Axillary dissection was performed in 224 (65.5%) patients. Of these, the number of nodes examined was recorded in 198 (88.4%) patients and ranged from 1 to 34 (median =14). One hundred and thirty eight (69.7%) were node positive and 59 (42.8%) of these had more than three nodes involved. None of our patients had sentinel node biopsy performed.

Histopathological reporting

The tumor size, histopathological grade, margins of excision, and the total number of nodes removed were recorded in 158 (42.5%), 308 (82.4%), 69(18.5%) and 198 (53.2%) patients respectively. Histopathological type was reported in all patients. Estrogen receptor and progesterone receptor status was not reported in all patients.

Adjuvant therapy

Post-operative treatment consisting of adjuvant chemotherapy, radiotherapy, or hormonal therapy, alone or in combination was used in both pre-menopausal and post-menopausal patients. Adjuvant chemotherapy was given in 59 (42.8%) patients who had more than three nodes involvement. This included 51 out of 202 (25.2%) pre-menopausal and 8 (4.7%) post-menopausal patients. A combination of Cyclophosphamide, Methotrexate, and 5-fluorouracil (CMF) or Cyclophosphamide, Adriamycin and 5-fluorouracil (CAF) given in six cycles was commonly used. Adjuvant hormonal therapy was used in 208 (55.6%) patients and included 111 out of 202 (54.9%) pre-menopausal and 97 out of 172(56.4%) post-menopausal patients. Justification for use of hormonal therapy could not be assessed because estrogen and progesterone receptor status was not available in all patients. Fifty-two (19.0%) patients including 34 out of 202 (16.8%) pre-menopausal and 18 out of 172 (10.5%) post-menopausal patients received adjuvant radiotherapy (Table 1).

Table 1: Indicators of quality of breast cancer care observed at BMC compared with the internationally accepted target

Parameters	Number and percentages of patients having the procedure (N / %)	Internationally accepted (expert) target (%)
Diagnosis		
• Preoperative mammography	56 (14.9)	~100
• Preoperative biopsy		>90
○ FNAC	221 (59.0)	
○ Excisional biopsy	214 (57.2)	
• Non-diagnostic fine needle biopsy	67 (17.9)	<10
• Triple assessment	42 (11.2)	~100

• Preoperative staging	289 (77.3)	>94
Surgical treatment		
• Breast conserving surgery	6 (1.6)	~50
• Axillary dissection	224 (65.5)	>90
Histopathological reporting		
• Tumor size	158 (42.5)	>99
• Grade	308 (82.4)	>99
• ER/PR status	Not performed	>99
• Number of nodes	198 (88.4)	>99
Adjuvant chemotherapy	59 (42.9)	
• Premenopausal	51/202 (25.2)	>90
• Postmenopausal	8/172 (4.7)	>50
Adjuvant hormonal therapy	208 (55.6)	
• Premenopausal	111/202 (54.9)	>90
• Postmenopausal	97/172 (56.4)	>90
Adjuvant radiotherapy	52 (19.0)	
• Premenopausal	34/202 (16.8)	>90
• Postmenopausal	18/172 (10.5)	>90

Note: These indicators were based on an international consensus conference and other publications

Keys: FNAB, Fine needle aspiration biopsy; ER/PR, estrogen receptor/progesterone receptor

Discussion

The study findings indicate that the majority of breast cancer patients presented at young age with large tumor size and advanced stage of the disease which is in keeping with other studies in developing countries (Vorobiof *et al.*, 2001; Adesunkanmi *et al.*, 2006; Rambau *et al.*, 2011; Mabula *et al.*, 2012, Chalya *et al.*, 2013), but at variant with data from the West (Ikpat *et al.*, 2002; Fregene & Newman, 2005; Awadelkarim *et al.*, 2008). Similar epidemiological pattern has also been reported previously from this area (Rambau *et al.*, 2011, Mabula *et al.*, 2012, Chalya *et al.*, 2013). Age has been shown to be an important factor in the prognosis of breast cancer, whereby disease presentation at young age has shown a worse prognosis than in older age (Vorobiof *et al.*, 2001; Omar *et al.*, 2003; Adesunkanmi *et al.*, 2006). This has been explained by the fact that cancer at young age tends to be more aggressive and biological behavior could be different (Zavagno *et al.*, 2000; Rambau *et al.*, 2011). The reason for this observation remains unclear.

Preoperative bilateral mammography has been found to be useful in detecting breast cancer at an early stage which is often curable (Graf *et al.*, 2004; Mande *et al.*, 2004; Chalya *et al.*, 2013). Prior to definitive treatment of breast cancer, all patients should ideally have bilateral mammography not only to image the presenting breast lump, but also to exclude presence of multifocal disease and a cancer in the opposite breast (Graf *et al.*, 2004; Mande *et al.*, 2004). However, in resource-limited countries like Tanzania mammography may not be available in most centers. In this study, pre-operative bilateral mammogram was performed in only 14.9% of cases, the rate which is significantly lower than the international standards (Grilli *et al.*, 1991; Akhtar & Nadrah, 2005). Irregular availability of mammography in our centre (due to either breakdown or inability of patients to afford) could have contributed to the low rate of pre-operative bilateral mammography seen in our patients. Poor knowledge of the use of mammography as a screening tool for early detection of breast cancer may also be the reason for low rate of pre-operative bilateral mammogram in our patients.

In this study, fine needle aspiration cytology (FNAC) was performed in over half of the cases which is comparable with other studies done in developing countries (Mande *et al.*, 2004; Chalya *et al.*, 2013). FNAC is now regarded as the method of choice in the preliminary

investigations of breast lesions. It is simple, cost effective and less traumatic and can be used as a safe alternative for open biopsy. It has been found to have sensitivity ranging from 82% to 97.5% and specificity of more than 99% (Yong *et al.*, 1999; Dutta *et al.*, 2001). According to the international standards (Kline, 1981, Goldhirsch *et al.*, 1998; Akhtar & Nadrah, 2005), FNAC was found to be under-utilized in our patients. The triple assessment consisting of clinical evaluation, mammography and fine needle aspiration cytology has been recommended as a diagnostic tool for evaluation of patients with palpable breast lumps (Hught *et al.*, 1998; Mande *et al.*, 2004). When the three assessments are performed adequately and produce concordant results, the triple assessment diagnostic accuracy approaches 100% and definitive treatment can be started before histology (Kaufmann *et al.*, 1994; Mande *et al.*, 2004). Discordant results or results that cannot be evaluated may indicate the need for open biopsy (Kaufmann *et al.*, 1994; Mande *et al.*, 2004; Chalya *et al.*, 2013). Therefore, triple assessment can reduce anxiety and unnecessary repeated surgical procedures as well as delay in diagnosis. However, its application needs the availability of mammography and well trained cytologist to perform the FNAC and cannot be applied in centers where these facilities are lacking. In the present study, triple assessment before definitive surgery was under-utilized as it was performed in only 11.2% of cases which is below the recommended international standards.

In order to plan adequate treatment, especially breast-conserving surgery, every breast cancer patient needs evaluation by a team consisting of a surgeon, medical oncologist, radiation oncologist, pathologist, and a radiologist. Late presentation with advanced disease, non-availability of radiotherapy and barriers to patient follow-up may possibly explain why only a small proportion of patients undergoing surgery in our institution had lumpectomies. Nevertheless, patient preference and physician's choice are two of the other factors that may override the medical criteria and affect the rate of breast-conserving surgery (Hotobagyi, 1998). In conformity with international standards, only about two-thirds of patients undergoing definitive surgery had axillary dissection. In our study, none of our patients had sentinel node biopsy performed due to lack of this facility.

In agreement with other studies, (Akhtar & Nadrah, 2005; Mabula *et al.*, 2013), the histopathological reporting in our study did not meet the expected international standards. In the present study, estrogen receptor (ER) and progesterone receptor (PR) status was not reported in all patients because of non-availability of this facility at our centre. The pathological report is a critical link between pathologist and clinician. Deficits in pathological reports have, therefore, been the target of many quality improvement projects. The number of incomplete breast cancer pathology reports can be reduced by instituting a template for reporting (Hammond & Flinner, 1997).

Adjuvant chemotherapy is an important component of breast cancer treatment and it is widely used in many centers across the world (Ibrahmu *et al.*, 2011). In the present study, the rate of utilization of adjuvant chemotherapy both in pre-menopausal and post-menopausal patients did not meet the expected target. The low rate of utilization of adjuvant chemotherapy in our study can partly be explained by the fact that the majority of patients who were offered chemotherapy defaulted and did not complete the course. This observation is in keeping with other African studies (Kene *et al.*, 2011; Ibrahmu *et al.*, 2011). Non adherence to chemotherapy is a major challenge in breast cancer treatment especially in resource poor settings. Reasons for non-adherence in most developing countries include financial difficulty, relatively feeling well after commencement of chemotherapy, resorting to alternative treatment and drug side effects (Lawal & Adesunkanmi, 2008; Ibrahmu *et al.*, 2011). We could not establish the reasons for non-adherence to chemotherapy in our study due to the retrospective nature of the study. On the other hand, adjuvant hormonal therapy such as Tamoxifen alone reduces risk of recurrence and improves overall survival in all age groups in oestrogen positive cancers in both premenopausal and post menopausal women (Gakwaya *et al.*, 2008). In the current study, more than fifty-five percent of patients were given adjuvant hormonal therapy regardless of estrogen and

progesterone receptor status. This is because facilities for oestrogen receptor assay at BMC are not available as a result all our patients are given Tamoxifen, once a histological diagnosis is established irrespective of menstrual status.

Radiotherapy given as adjuvant therapy is an integral part of the management of breast cancer, particularly in patients with large tumors and many positive nodes (Overgaard, 2001). In this study, only 19.0% of patients requiring adjuvant radiotherapy had access to this modality of treatment. Adjuvant radiotherapy is required to reduce the risk of local recurrence following surgery (Gakwaya *et al.*, 2008). However, this form of adjuvant therapy was under-utilized in our patients probably due to the fact that radiotherapy is not available at Bugando Medical Centre and therefore patients requiring this form of treatment had to travel long distances to receive radiotherapy elsewhere. Because of lack of funds at the time of referral for radiotherapy in the majority of patients, only less than 20% of patients were able to travel and received this form of treatment.

The major limitation of this study is that some of information could not be retrieved from patients due to the retrospective nature of the study and this might have introduced bias to our study findings. However, despite this limitation, this study provided data that may be used to make interventions for improvement of quality of breast cancer care in our setting and in similar institutions in resource limited countries.

In conclusion, our study demonstrated that the quality of breast cancer care in this institution falls well below the accepted international standards, possibly due to non-availability of some of the therapeutic facilities such as radiotherapy and facilities for estrogen receptor assay, poor compliance to chemotherapy and the absence of local guidelines. Addressing these issues is of paramount importance in order to improve the quality of breast cancer care in our setting Establishment of radiotherapy services and local guidelines and the use of a template for histopathological reporting to reduce the number of incomplete breast cancer pathology reports is highly recommended in this institution.

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