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Barriers to timely surgery and early surgical outcomes for breast cancer patients in a setting with limited resources

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ABSTRACT

BACKGROUND: Breast cancer patients in Rwanda are young, premenopausal and presenting with advanced stages. Surgery is often the primary line of treatment and its timing may impact adjuvant medical and/or radiation therapies, influencing negative outcomes. The objective of this study was to identify barriers to timely surgery and describe early surgical outcomes for patients who underwent surgery for breast cancer at two tertiary hospitals in Rwanda.

METHODS: A cross-sectional study was conducted at the University Teaching Hospital of Kigali and Rwanda Military Hospital over 12 a month period from May 2016 to May 2017.

RESULTS: 69 patients met inclusion criteria. Median age was 48 years. 74.16% of patients ≤ 60 years, 58% were premenopausal. 69.5% presented with locally advanced stages. Mean duration of symptoms was 10.9 months before initial consultation. Patients had to wait 91 days (3 months) before surgery. Mean hospital stay was 5 days after surgery and 98.9% underwent modified radical mastectomy. No major complications reported. Socio-economic status(p=0.0002), level of education (p=0.000), traditional healer's consultation (p=0.0001) influenced the timing of the initial consultation. Level of first heath facility consulted (P=0.00045), number of breast surgeon (p=0.0000), pathology report availability, (p=0.0004) and imaging availability (p=:0.0006) influenced timing of surgery.

CONCLUSION: Delays to surgery are both patient and system-related. Increased awareness, surgical outreaches and task sharing with a non-breast surgical specialist may decrease delays to surgery and increase timely access to subsequent adjuvant therapies. Even if early surgical outcomes are good, long term follow up study is necessary to assess oncological outcomes.

Keywords: Timely surgery, breast cancer, surgical outcome, barriers to care.

BACKGROUND

Breast cancer (BC) is the most prevalent cancer in women and the leading cause of women's cancer related mortality worldwide [1]. The World Health Organization expects 16 million new cancers by 2020, 70% in developing countries with the majority of them being breast cancers in women [2,1]. In many developing countries including Rwanda, the majority of breast cancer patients are young, premenopausal women, presenting late with advanced stages and poor outcomes.

Indeed, surgery is the cornerstone of breast cancer treatments. However, an estimated 5 billion people do not have access to timely, safe and affordable surgical and anesthesia care worldwide [3,4].

Improving infrastructure and increasing human resources to provide surgery will play a key role to address this gap [5]. However, it is important to note that before 2013, surgery was the most available treatment modality for breast cancer in Rwanda.

It was received in monotherapy by 48% of breast cancer patients, before chemotherapy (3%) and radiotherapy (0%)[6]. Furthermore, breast cancer surgery has been identified to be the single most effective treatment modality for early cancers; it is a cost-effective intervention and the most available in low and middle income countries [7-9]. In addition, surgery plays a pivotal role in the continuum of care in breast cancer management within multidisciplinary teams [10].

Delays to surgery can either be patient-related or due to system setbacks. Patient delay refers to the delay in seeking medical care after the self-discovery of a breast cancer symptom. System delay time refers to the time between registering for the first medical visit and the actual commencement of therapy [11]. This type of setback occurs within the healthcare system and includes delays in getting appointments, scheduling diagnostic tests, receiving a definitive diagnosis and initiating therapy. The sum of the two is referred to as the total delay time [12].

Since surgery seems to be the most available and cost-effective therapeutic option in low to middle income countries (LMIC), it is important to maximize its benefits. So far, few studies have been conducted to assess safety and accessibility of surgical care in breast cancer patients.

METHODS

A cross-sectional study was conducted at the University Teaching Hospital of Kigali and Rwanda Military Hospital over a 12-month period from May 2016 to May 2017. This study included patients diagnosed and surgically treated for breast cancer during the study period.

The objective of this study was to identify timing of surgery, factors influencing surgical delays and describe early surgical outcomes for patients operated on for breast cancer at two tertiary hospitals. All patients that were surgically treated for breast cancer during the study period have been included in the study. However, for indicative purposes, a minimum sample size for proportion was calculated using open info sample size calculator (Proportion), assuming finite large population, breast cancer anticipated prevalence of 5% [13] and a level of absolute precision of 5%. For 95% confidence interval, the minimum sample was estimated at 73 patients.

Participants were included using enumerative sampling. A pre-established questionnaire was completed to collect data either from patient interviews or using secondary data from the pathology laboratory registry, pathology reports and patients' files. Demographic information, clinic-pathological characteristics, symptoms duration, time to initial consultation, subsequent events, patient's pathway, timing of surgery and occurrence of major complications within 30 days postoperative were collected. From the data collection sheets, data were entered in Epidata 3.1 and then transferred to STATA for analysis.

Percentages and means have been used for descriptive statistics. A chi-square test was used to compare two proportions and for comparison of two means t-test. A p-value less than 0.05 was considered statistically significant. The study was approved by Institution Review Board (IRB) of College of Medicine and Health Sciences, University of Rwanda and Ethical Clearance Committees of both hospitals. All participants were required to sign an informed consent before being enrolled and there was no interference with therapeutic decisions.

RESULTS

79 patients have been operated on for breast cancer during the study period. 74 of them met the inclusion criteria. The median age was 48 years (range 24 – 82; mean 53.2 years). 74.16% patients were below 60 years of age, 58% being premenopausal. 69.5% of patients presented at stage III on first consultation at tertiary hospital. 57% had no education and 58% classified in "Ubudehe category I", the lowest socio-economic category in Rwanda. Painless breast lump was the presenting sign in 60.5% of women. Invasive ductal carcinoma was the main histology type in 59.44 %. However, molecular sub-types were known only in 21.7% of cases predominantly triple negative in 58% (Table 1).

Before initial consultation (patient-related delay), the mean duration of symptoms was 10.9 months ranging from 3 to 40 months. 39.7% of patients consulted traditional healers before conventional medicine. After the first health facility consultation, the patient spent an average of 3 months (range 1-9 months) before accessing surgery. 82.7% consulted tertiary hospital with a referral note either from a health centre or a district hospital. The mean number of tertiary hospital visits was 3.3 visits before surgery. Socio-economic status (p=0.0002), level of education and traditional healer's consultation (p=0.0001) influenced the timing of the first hospital consultation. However, the first heath facility consulted (P:0.00045), pathology report availability (p=0.0004) and imaging availability (p=:0.0006) influenced timing of the surgery (Appendix 1 and 2).

The mean hospital stay after surgery was 5 days (range 3-12). 98.9% of patients underwent modified radical mastectomy. One patient had skin sparing mastectomy with immediate breast reconstruction using autologous latissimus dorsi flap. Postoperative complications were reported in seven patients, two had surgical site infection, four seroma formation. No death reported (Table 2).

Table 1: Patients characteristics (N=69)

		N	%
Gender	Female	69	100%
Age	<20 years	0	0
	20-40 years	27	39.2
	40-60 years	24	35
	>60 years	18	26
Edcation level	Primary school	25	36.2
	Ordinary level	9	13
	Advanced level	14	20.2
	Bachelor's or Master's degree	1	1.4
	Never went to school	20	28.9
Profsion	Unemployed	6	8.7
	Self employed	4	5.8
	Employed (government, NGO, private)	18	26
	Farmer	37	53.6
	Students	4	5.8
Monthly income*	<10 000 RWF (11.90 USD)	24	34.7
	10 000 − 50 000 RWF (11.90 − 59.50 USD)	28	40.6
	>50 000 RWF (59.50 USD)	17	24.7
Health insuance	Community-based health insurance	58	84
	Private/Other	4	5.8
	No insurance	7	10.2
Histoogy	Invasive ductal carcinoma	41	59.4
	Invasive lobular carcinoma	21	31.2
	Inflammatory Breast carcinoma	3	4.3
	Ductal carcinoma in situ	2	2.9
	others	2	2.9
Mlecular subtypes	Unknown (ER,PR, HER2/Neu not done)	54	78.2
	Known (ER,PR, HER2/Neu done)	15	21.8
Stage	Stage 0	2	2.9
	Stage I	0	0
	Stage II	22	31.8
	Stage III	41	59.4
	Stage IV	4	5.8

Table 2: Surgical outcomes

		N=69	%
Type of procedure	Modified radical mastectomy	58	84
	Simple mastectomy	2	2.9
	Breast conserving surgery	6	8.7
	Palliative procedure	3	4.4
	Other to specify		
Hospital stay in days	Less than 7 days	54	78.3
	7-14 days	15	21.7
	More than 14 days	0	0
In hospital complications	Yes	7	10.1
	No	62	89.9
Types of complications if any	Post op bleeding/hematoma	0	0
	Surgical site infection	2	2.8
	Seroma formation needing as	4	5.8
	Skin flap partial necrosis	0	0
	Nerve injury	0	0
	Lymphedema before 30 days	1	1.4
Mortality	Yes	0	0
	No	69	100

Breast cancer delay has been defined as a span of more than three months between the discovery of symptoms by a patient and the beginning of definitive cancer treatment [11].

Our study shows that both patient-related and system-related delays are still high, resulting in a total of 14 months in average before surgery. In a previous study done in Rwanda by Pace Lydia et al. in 2014, the total delay was found to be 15 months, which is quite similar to ours. Indeed, between then and now, little has been done to address the challenges highlighted by Pace Lydia et al. [16].

However, it is unclear whether delays of any type are associated with adverse consequences. Caplan et al. reviewed the results of studies on the effects of delay on prognosis, especially survival, following a diagnosis of breast cancer. Earlier studies revealed that increased delay resulted in more advanced stages of disease and decreased survival. These studies support the logical conclusion that advanced disease at diagnosis will lead to poorer prognosis and shorter survival [17] ; however, more recent studies report mixed results, particularly with respect to survival. A 2010 study reported that delays to treatment (surgical or systemic) both less than or more than 90 days were associated with similar survival outcomes [18]. However, another study

DISCUSSION

Patients with breast cancer in Rwanda are generally young, premenopausal women and present with locally advanced disease. Authors who investigated breast cancer in Africa found similar trends. Galukande et al., found a mean age of 49 years, while Indrojit Roy et al., found a mean age of 46 years with 45.16% being between 45 and 60 years and the majority of them being locally advanced [14,15].

Ntirenganya et al.   Barriers to timely surgery and early surgical outcomes for breast cancer

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concluded that a longer treatment delay (>6 weeks) was a statistically significant risk factor for shorter survival [19]. There seems to be a correlation between treatment delay and survival according to stage: intervals >60 days from a biopsy-confirmed breast cancer diagnosis and treatment initiation had no effect on survival in patients with early-stage disease, but were associated with significantly worse survival in those with advanced-stage disease [18].

Only 21.73% had breast cancer molecular sub-types known before surgery. This may be explained simply by very limited access to immunohistochemistry (IHC). In Rwanda, IHC is not yet readily available and is rarely done in public hospitals. Indeed, molecular sub-typing has become the gold standard and cornerstone of modern breast cancer management. It allows not only to tailor treatments to intrinsic tumour characteristics, but also to select patients qualifying for molecular targeted therapies and avoid inefficient or unnecessary treatments. However, when immunohistochemistry, is not available or accessible, as it is the circumstance in the majority of cases in Rwanda, clinicians tend to prescribe empirical blind treatments which may be contributing to current poor outcomes.

Low socio-economic category, low level of education, and traditional healer's consultation were identified as factors associated to patient-related delays; while the level of first heath facility consulted, duration for pathology and imaging availability are determinants of system-related delays. Odongo et al. had similar findings in Uganda [20]. To fix the above-mentioned predictors may require complex interventions. In fact, actions may range from awareness, infrastructure and theatre space, pathology, imaging, surgical and anaesthesia workforce availability, to formal education programs and poverty reduction. However, ad hoc interventions like awareness campaigns, mobile breast clinics, task shifting and task sharing strategies may decrease delays to surgery and increase timely access to subsequent adjuvant therapies for better outcomes.

In our study, almost all patients underwent modified radical mastectomy with only one patient having skin sparing mastectomy with immediate breast reconstruction using autologous latissimus dorsi flap. Indeed, modified radical mastectomy is still the main surgical procedure offered to patients in LMICs for various reasons including, but not limited to the following: local advanced disease, no access to immunohistochemistry and molecular sub-typing limiting use of neoadjuvant chemo/hormonotherapy, lack of technical expertise for safe breast conserving surgery and no availability or accessibility to radiotherapy services.

Overall, there were few complications made mainly by postoperative seroma formation which requested serial aspirations in four patients. The rate of infection in our series was of 2.8%, similar to what was reported in other studies [8].

CONCLUSION

Delays to surgery are both patient-related and system-related. Patients with breast can present 10 months after symptomatology and wait 3 months in average before accessing surgery. Increased awareness, infrastructure and pathology, imaging and surgical workforce may decrease delays to surgery and increase timely access to subsequent adjuvant therapies. However, even if early surgical outcomes are good, a long term follow up study is necessary to assess oncological outcomes.

Study limitations

Being an observational study, we assumed that all patients received standard and adequate therapy according to their diagnosis and staging. This study was conducted in 2 hospitals, with 2 different surgical teams. This can constitute a bias and influence the outcomes.

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Appendix 1: Patient-related delays to surgical care

Patient-related delays			
Delays in Seeking Care	N	%	P-value
Knowledge and attitude about breast cancer			0.0004
Consulted a traditional healer first	27	39.1	
Prior poor experience with health system	19	27.5	
Acceptance of surgery as a means to cure breast cancer	32	46.3	
Delays in Reaching surgical Care			0.0001
First consulted traditional medicine	27	39.1	
First consulted Health center	19	27.5	
First consulted District Hospital	11	15.9	
Went directly to Tertiary Hospital	12	17.4	
Time to reach the health facility first consulted			0.0001
1 hour	6	8.7	
1-2 hours	28	40.6	
>2 hours	35	50.7	
Method of transportation to health facility			0.0001
Walk by foot	45	85	
Public transportation	30	57	
Motor vehicle	12	23	
Bicycle	6	11	
Personal vehicle	0	0	
Do you have financial difficulties to access care?			0.0002
Yes	39	71	
Sometimes	11	21	
No	4	8	
Cost of transportation*			
< 5 000 RWF (5.95 USD)	9	17	
5 000-10 000 RWF (5.95 − 11.90 USD)	43	79	
>10 000 RWF (11.90 USD)	2	4	

Appendix 2: System-related delays to surgical care

System-related delays	n	%	P-Value
Waiting transfer to health facility offering breast cancer surgery			0.0003
Less than 2 weeks	22	31.9	
2-4 weeks	32	46.3	
More than 1 month	15	21.7	
Waiting consultation by a surgeon			0.001
Less than 2 weeks	9	13	
2-4 weeks	33	47.8	
More than 1 month	27	39.2	
Waiting biopsy to be done			0.461
Less than 2 weeks	47	68.1	
2-4 weeks	14	20.3	
More than 1 month	8	11.6	
Waiting biopsy results			0.0002
Less than 2 weeks	6	8.7	
2-4 weeks	17	24.6	
More than 1 month	46	66.7	
Waiting imaging/staging investigations			0.0006
Less than 2 weeks	24	34.8	
2-4 weeks	32	46.4	
More than 1 month	13	18.8	
Waiting surgery appointment			0.0004
Less than 2 weeks	23	33.3	
2-4 weeks	37	53.6	
More than 1 month	9	13.1	
Days to surgery from symptoms onset			
Less than 30 days	11	15.9	
30- 90 days	24	34.8	
More than 90 days	34	49.3	