

RESEARCH ARTICLE

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Surgeons' Recommendation is the Factor in Determining the Breast Cancer Surgery Procedures: an Experience from Rural Hospital in Thailand

Ajaree Sattaratnamai^{1*}, Noppawat Samankatiwat², Visnu Lohsiriwat³

Abstract

Introduction: The majority of breast cancer patients in rural hospital in developing countries still warrant for total mastectomy. Surgeon advice regard surgical procedure is one of the most important factors in decision making. Our study aims to compare the rate of breast-conserving surgery (BCS), mastectomy (MT) and mastectomy with immediate breast reconstruction (MTIBR) between the surgeons who offer only MT (group A) and who offer BCS MT and MTIBR (group B). **Method:** A retrospective cohort study was conducted at Ratchaburi hospital, Thailand from January 2010 to April 2014. We categorized patients into 2 groups (group A and B). Univariate analysis was selected to determine the factors that associated with the breast surgery procedures. **Results:** From January 2010 to April 2014, we recruited 310 breast cancer patients, 221 patients (71.2%) were treated by surgeons in group A, 89 patients (28.7%) by surgeons in group B. The choice of breast surgery is significantly different between 2 groups ($P < 0.001$). In group A, 213 (96.3%) patient had MT and only 3 (1.3%) BCS and 5 (2.2%) MTIBR. Whilst in group B, 58 (65.1%) patient had MT and 11 (12.3%) BCS and 20 (22.4%) MTIBR. Choice of breast surgery in patients with stage 1,2,3 are significantly different between 2 groups ($P = 0.004, < 0.001, 0.025$ respectively). Age is the only factor that significantly affects the choice of surgery in the group B but not in group A. **Conclusion:** Surgeon's competency and comprehensive preoperative consultation by offering BCS, MT and MTIBR can affect the choice of surgical procedure for breast cancer patient.

Keywords: Breast conserving surgery- breast reconstruction- breast surgery- mastectomy

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Introduction

Breast-conserving surgery (BCS) has long been studied to be no significant differences to radical mastectomy in term of overall survival rate (Fisher et al., 2002; Veronesi et al., 2002). Therefore, BCS has become the surgical treatment of choice for women with early breast cancers. There are studies about the factors that correlated with the rate of mastectomy and breast-conserving surgery including age, race, education, comorbidity of patients (Alderman et al., 2008; McCahill et al., 2009) and the surgeons' recommendation (Temple et al., 2006; Opatt et al., 2007; Reitsamer et al., 2008; Rippy et al., 2014). Breast-conserving surgery rate is preferable for the high-volume surgeons, surgeons in the large cancer centers (Opatt et al., 2007), and those who are affiliated with academic center.

Breast reconstruction has been purposed to reduce mutilation after mastectomy. Nowadays, there are many types of breast reconstruction, for instances the autologous or implant based reconstruction. It can be immediate

or delayed breast reconstruction (Kronowitz, 2015). Immediate breast reconstruction has been performed by plastic surgeon or the general surgeons who have been trained to do the reconstruction by themselves. Therefore, breast reconstruction rate depend on referral system to plastic surgeons (Alderman et al., 2007).

The patients in the rural hospital seem to have limited of knowledge regards breast cancer treatment. Therefore, the choice of surgery is mostly depend on surgeons' decision. In some circumstances, mastectomy seems to be the only choice that has been offered, therefore, most of breast cancer patients underwent mastectomy. BCT and breast reconstruction is still not widely implemented. Thus, most of patients believe that having breast cancer mean they have to undergo mastectomy. As a result, some of them fear to come to the doctors for screening and treatment resulting in high incidence of locally advance breast cancer and metastatic breast cancer at diagnosis. These became the vicious cycle for breast cancer treatment in Thailand.

In the rural hospital in Thailand, surgeon is

¹Department of Surgery, King Chulalongkorn Memorial Hospital, ²Department of Surgery, Ratchaburi Hospital, ³Division of Head-Neck and Breast Surgery, Department of Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand.

*For Correspondence: ja.ajaree@gmail.com

the important factor for patients to make their decision. In our hospital, not every surgeon offers BCT and breast reconstruction for breast cancer patients due to several limitations. Our study aims to compare the choices of surgery between groups of patients who had the choice of mastectomy (MT), breast-conserving surgery (BCT) and breast reconstruction (MTIBR) by their surgeons and the group that primarily only offer MT. Our hypothesis is that the choices of breast cancer surgery in the rural hospital in Thailand depend on preoperative information by surgeons.

Materials and Methods

Data collection and Study Subjects

This study received approval from ethics committee. A retrospective cohort study was conducted at Ratchaburi hospital, which is the regional hospital in Thailand. We collected all the data from the chart review of the breast cancer patients who came to Ratchaburi hospital from January 2010 to April 2014. We excluded 1 male patient, 14 with incomplete information, 3 didn't undergo surgery, and 2 dead. We categorized the patients into 2 groups (group A and B). Group A is the patients who received the surgical treatment by the surgeons who primarily only offer MT. Group B is the breast cancer patients who were treated by the surgeons who provide all the choices of breast surgery that they are eligible for their staging which is breast-conserving surgery, mastectomy or breast reconstruction. Patient demographics including age at diagnosis, marital status, occupation were recorded. Tumor biology, Tumor size at time of first diagnosis was recorded as a continuous variable and categorized into three groups (<2cm, 2-5cm, >5cm) according to TNM classification guideline, tumor localization, hormonal status was recorded. The surgical treatment received including breast-conserving surgery (BCS), Mastectomy (MT), and Mastectomy with immediate breast reconstruction (MTIBR) was registered.

Statistical Analysis

We compared the choices of breast surgery between both groups. Univariate analysis was used to determine the factors that associated with the choice of breast surgery such as age, marital status, and clinicopathologic characteristics of tumor which are tumor size, location of tumor, and types of tumor were also analyzed. Chi-square and Fisher's test were used to analyze the association between the choices of surgery for breast cancer patients in each stage of both groups. P-value<0.05 were considered as statistically significant. SPSS version 20.0 is the analysis tool.

Results

Total number of patients who came to the breast clinic is 310 patients. Two hundred twenty one of 310 are the patients in group A, who received the surgical treatment by the surgeons in Group A and 89 of 310 are the patients in group B whom their surgeons provided three choices of breast surgery according to their cancers. Mean Age of all breast cancer patients at first diagnosis is 54.4 years

old. 54.9 in group A and 53.3 in group B. Age group and marital status has no significantly different between both groups. Size of tumor when they were first diagnosed is mostly between 2 and 5 cm (T2) 189 of 310 (60.9%). Most patients was diagnosed with stage II breast cancer and the staging is not significantly different between both groups (p=0.498). Most common location of breast tumor is upper outer quadrant (151/310=48.7%). Invasive Ductal carcinoma is the most common type of breast cancer patients (283/310=91.3%). Overall, the demographic data are comparable in both groups (Table 1).

From 310 patients, 271 patients underwent mastectomy (87.4%), 14(4.5%) breast-conserving surgery, and 25 (8.1%) mastectomy with immediate breast reconstruction. In group A, numbers of patients who underwent breast-conserving surgery, mastectomy,

Table 1. Demographic Data and Clinicopathological Characteristics of Breast Cancer Patients in both Groups (IDC, Invasive Ductal Carcinoma; ILC, Invasive Lobular Carcinoma; DCIS, Ductal Carcinoma in Situ)

| | All (n=310) | Group A (n=221) | Group B (n=89) | P value |
|-------------------------------------|----------------|--------------------|-------------------|------------|
| Number of patients | 310 | 221 | 89 | |
| Mean age of 1st Diagnosis(years) | 54.42 | 54.88 | 53.28 | |
| Age | | | | |
| <=40 | 32 | 18 | 14 | 0.27 |
| 41-50 | 92 | 69 | 23 | |
| 51-60 | 98 | 68 | 30 | |
| 61-70 | 60 | 46 | 14 | |
| >70 | 28 | 20 | 8 | |
| Marital status | | | | 0.518 |
| Single | 86 | 61 | 25 | |
| Married | 224 | 160 | 64 | |
| Tumor size(cm) | | | | |
| <=2 | 70 | 50 | 20 | 0.367 |
| 2-5 | 189 | 129 | 60 | |
| >5 | 43 | 34 | 9 | |
| Staging | | | | |
| 0 | 10 | 6 | 4 | 0.498 |
| 1 | 38 | 25 | 13 | |
| 2 | 164 | 114 | 50 | |
| 3 | 81 | 62 | 19 | |
| 4 | 12 | 10 | 2 | |
| Location of tumor | | | | |
| Upper outer | 151 | 109 | 42 | 0.91 |
| Upper Inner | 53 | 35 | 18 | |
| Lower Outer | 37 | 26 | 11 | |
| Lower Inner | 20 | 13 | 7 | |
| Central | 38 | 27 | 11 | |
| Type | | | | |
| IDC | 283 | 201 | 82 | 0.883 |
| ILC | 8 | 6 | 2 | |
| DCIS | 10 | 6 | 4 | |
| Others | 11 | 8 | 3 | |

Table 2. Univariate Analysis of Factors that Affected the Choices of Breast Surgery for Patients in Group A

| | All | BCS | MT | BR | P-value |
|-----------------|-----|-----|-----|----|---------|
| Age (years) | | | | | |
| <=40 | 18 | 0 | 17 | 1 | 0.508 |
| 41-50 | 69 | 0 | 66 | 3 | |
| 51-60 | 68 | 1 | 66 | 1 | |
| 61-70 | 46 | 1 | 45 | 0 | |
| >70 | 20 | 1 | 19 | 0 | |
| Tumor size (cm) | | | | | |
| <=2 | 50 | 0 | 50 | 0 | 0.350 |
| 2-5 | 129 | 2 | 124 | 3 | |
| >5 | 34 | 1 | 31 | 2 | |
| Location | | | | | |
| Upper outer | 109 | 2 | 104 | 3 | 0.939 |
| Upper Inner | 35 | 1 | 33 | 1 | |
| Lower Outer | 26 | 0 | 25 | 1 | |
| Lower Inner | 13 | 0 | 13 | 0 | |
| Central | 27 | 0 | 27 | 0 | |
| Type | | | | | |
| IDC | 201 | 2 | 194 | 5 | 0.220 |
| ILC | 6 | 0 | 6 | 0 | |
| DCIS | 6 | 0 | 6 | 0 | |
| Others | 8 | 1 | 7 | 0 | |
| Marital status | | | | | |
| Single | 61 | 1 | 59 | 1 | 0.907 |
| Married | 160 | 2 | 154 | 4 | |

(IDC, Invasive ductal carcinoma; ILC, Invasive lobular carcinoma; DCIS, Ductal carcinoma in situ; BCS, breast-conserving surgery; MT, mastectomy; BR, breast reconstruction)

and mastectomy with immediate breast reconstruction are 3 (1.4%), 213(96.4%) and 5 (2.3%) respectively. In group B, numbers of patients who underwent breast-conserving surgery, mastectomy, and mastectomy with immediate breast reconstruction are 11(12.4%), 58 (65.2%) and 20 (22.5%) respectively. The choice of breast surgery is significantly different between 2 groups. (P<0.001) (Figure 1).

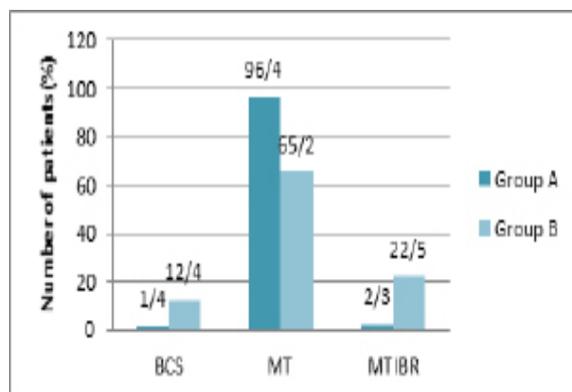


Figure 1. Number of Patients Underwent each Type of Surgery in Group A Compared with Group B, BCS; Breast-Conserving Surgery, MT; Mastectomy, MTIBR; Mastectomy with Immediate Breast Reconstruction

Table 3. Univariate Analysis of Factors that Affected the Choices of Breast Surgery for Patients in Group B

| | All | BCS | MT | BR | P-value |
|-----------------|-----|-----|----|----|---------|
| Age(years) | | | | | 0.001 |
| <=40 | 14 | 3 | 4 | 7 | |
| 41-50 | 23 | 4 | 10 | 9 | |
| 51-60 | 30 | 3 | 23 | 4 | |
| 61-70 | 14 | 0 | 14 | 0 | |
| >70 | 8 | 1 | 7 | 0 | |
| Tumor size (cm) | | | | | 0.074 |
| <=2 | 20 | 5 | 14 | 1 | |
| 2-5 | 60 | 5 | 37 | 18 | |
| >5 | 9 | 1 | 7 | 1 | |
| Location | | | | | 0.330 |
| Upper outer | 42 | 5 | 31 | 6 | |
| Upper Inner | 18 | 3 | 8 | 7 | |
| Lower Outer | 11 | 2 | 8 | 1 | |
| Lower Inner | 7 | 1 | 4 | 2 | |
| Central | 11 | 0 | 7 | 4 | |
| Type | | | | | 0.160 |
| IDC | 82 | 11 | 53 | 17 | |
| ILC | 2 | 0 | 0 | 2 | |
| DCIS | 4 | 0 | 3 | 1 | |
| Others | 3 | 1 | 2 | 0 | |
| Marital status | | | | | 0.759 |
| Single | 25 | 4 | 15 | 6 | |
| Married | 64 | 7 | 43 | 14 | |

(IDC, Invasive ductal carcinoma; ILC, Invasive lobular carcinoma; DCIS, Ductal carcinoma in situ; BCS, breast-conserving surgery; MT, mastectomy; BR, breast reconstruction)

We categorized the patients from both group into stage 0 to stage IV. Choice of breast surgery in patients with stage 1,2,3 are significantly different between 2 groups (P=0.004, <0.001, 0.025 respectively) after we provided more choice of surgery. In group A, 213 (96.3%) patients underwent mastectomy. Whilst in the group B, which surgeons provided choice of breast-conserving surgery and breast reconstruction, the number of patients underwent mastectomy is 58 (65.1%). Mastectomy rate in group B is lower than group A. Also in group B, more patients underwent breast-conserving surgery (12.4%) and breast reconstruction (22.5%).

Univariate analysis was used for each group of patients. In group A, age is the only factor that affects the choices of surgery, because choices of breast surgery are significantly different between age groups (P-value=0.001). No significant difference in choices of breast surgery for tumor size, location of tumor, type of tumor and marital status of patients (P-value=0.074, 0.33, and 0.16 respectively). In group B, age, tumor size, location of tumor, type of tumor and marital status of patients are all not significantly affected the choices of breast surgery (P-value=0.50, 0.35, 0.93, 0.22, and 0.90 respectively) (Table 2,3).

Discussion

Although, Breast-conserving surgery (BCS) has been demonstrated to be equivalent to mastectomy in terms of outcome, the rate of breast-conserving surgery is varied in each study. In the study, performed in Asian patients in middle income country, 46% has BCS and 54% chose mastectomy (Teh et al., 2014). Our study was in the setting of regional hospital of Thailand, which is also the middle income country in Asia, but higher rate of mastectomy was performed (87.4%).

Breast-conserving surgery technique has been introduced for more than 10 years in our hospital, but the choice of breast surgery is depend on surgeons' preferences. Lack of radiation therapy is one of the reasons that make most of surgeon prefer mastectomy to breast-conserving surgery.

Most of surgeons provided neither the choice of breast reconstruction nor breast conserving surgery. In our study, we categorized patients into 2 groups (A and B). In group B, the patients were provided the choices of oncoplastic surgery which are breast-conserving surgery and breast reconstruction. We found that the choice of breast surgery is significantly different between 2 groups ($P < 0.001$). The mastectomy rate is lower from 96.4% to 65.2%, whereas the rate of breast-conserving surgery and breast reconstruction is higher from 1.4% to 12.4% and from 2.3% to 22.5% respectively.

Surgeon factors are important predictors of type of planned surgery (Temple et al., 2006; Rippy et al., 2014). Patients perceived to be their surgeons' preference was the predictors of treatment preference (Molenaar et al., 2004). Mastectomy rate is varied depend on each surgeon's decision even in the same breast center (Reitsamer et al., 2008). Surgeons in cancer center and teaching hospital are more likely to choose BCS than surgeons in the community hospital (Chagpar et al., 2006; Opatt et al., 2007). More breast-conserving surgery were performed by high volume surgeons ($p = 0.012$) (Chagpar et al., 2006).

Breast reconstruction must be performed by plastic surgeons or general surgeons who have been trained to do breast reconstruction technique. Since, no plastic surgeon is available in our hospital and most of surgeons in our hospital have never been trained to do breast reconstruction, therefore they tend to not provide the choice of breast reconstruction to their patients. From another study, most of general surgeon didn't discuss about breast reconstruction before surgical treatment. After discussion about breast reconstruction with their surgeons patients chose more mastectomy (OR 2.06, $P < 0.01$) (Alderman et al., 2008). Breast surgeon's decision to refer a patient for reconstruction significantly affects whether the patient will receive breast reconstruction (Preminger et al., 2012). 40% of breast surgeons did not refer mastectomy patients for reconstruction because their concerns over cancer recurrence and advanced patient age. Patients did not undergo reconstruction because their refusal, need for radiation therapy, delay adjuvant oncologic treatment, patient factors, no plastic surgeon available

(Stacey et al., 2008). Surgeons who are woman, have high clinical breast volume, and work in the cancer center tend to have a high referral propensity to refer patients to plastic surgeons (Alderman et al., 2007).

Apart from Surgeon factor, patient is also the important factor to determine the choices of breast surgery. Some study found the conflicts between patients decision to undergo mastectomy when their surgeons recommended the breast-conserving surgery (Opatt et al., 2007). Especially, when surgeons provide both choices without favoring one over another, more patients will choose mastectomy because their fear of recurrence and to avoid radiation therapy (Temple et al., 2006; Morrow et al., 2009; Rippy et al., 2014).

In our study, univariate analysis was used to analyze in each group of patients. Age is the factor that significantly affects the choice of surgery in the group that we provided choices of surgery, but not affected in conventional group. Patients older than 60 years old, underwent more mastectomy than younger patients (Teh et al., 2014). Surgeons were significantly more likely to discuss about breast reconstruction with younger patients (Alderman et al., 2008; Jeevan et al., 2017). Age is the influent factor for referral decision, and this decision will affect the rate of breast reconstruction (Preminger et al., 2012).

Other factors including larger tumor size and central localization tumor are affected the higher rate of mastectomy (Alderman et al., 2008; Reitsamer et al., 2008; Teh et al., 2014). Surgeons were significantly more likely to discuss about breast reconstruction with larger tumors (Alderman et al., 2008). In our study, tumor size, location of tumor, and type of tumor are not affected the choice of breast cancer surgery in both group.

In conclusion, surgeon is the influential factor for determining the choice of breast surgery in the rural hospital of Thailand. Surgeon's competency and comprehensive preoperative consultation by offering BCS, MT and MTIBR can affect the choice of surgical procedure for breast cancer patient. Surgeons should provide more information about the choice of breast surgery that they are eligible. Patients should have more involvement in the treatment process. Whereas the surgeons in the rural hospital should be trained to do the breast-conserving surgery and breast reconstruction techniques in order to provide more privileges to patients to access more choices of breast cancer surgery.

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