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The impact of immediate breast reconstruction after mastectomy on time to first adjuvant treatment in women with breast cancer in a community setting

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ABSTRACT

Background: The impact of immediate breast reconstruction on the time to first adjuvant therapy is controversial.
Methods: Retrospective study design comparing time to first treatment in women undergoing mastectomy with and without immediate reconstruction in a community cancer center.
Results: Seventy-six cases fit inclusion criteria of which 44 (58%) underwent mastectomy with immediate reconstruction. Women undergoing immediate reconstruction were younger, had more bilateral mastectomies and had fewer prior breast procedures. The median time to first adjuvant therapy was longer in the immediate reconstruction group [80.5days (36–343) versus 53.5 days (18–96), $p = 0.003$]. Fifteen of 44 patients had the start of adjuvant treatment over 90 days after resection, 14 of whom (93%) had immediate reconstruction versus 1 (7%) who did not ($p = 0.01$).
Conclusion: In this study immediate breast reconstruction was associated with a longer time to first adjuvant treatment, with adjuvant therapies being more likely delayed over 90 days.

1. Background

Breast cancer treatment planning is becoming increasingly complex. As more women are choosing mastectomy and bilateral mastectomy who might otherwise be eligible for breast preservation, the rates of incorporation of breast reconstruction has also increased.[1] The time required for evaluation, treatment planning and care coordination (which includes issues of reconstruction) has increased the time from first physician evaluation to operative therapy for breast cancer patients from 21 days in 1992 to 32 days in 2005.[2] Although many factors affect time to operation including demographic, geographic and pretreatment variables, a large population based study suggests that the addition of immediate breast reconstruction to the operative treatment delays the surgical procedure by an average of 12 days.[2] While the clinical significance of short delays may be argued, a recent large population based study of patients utilizing SEER and NCDB databases demonstrated a decrement in overall and disease-specific survival related to 30-day incremental delays in time to an operation in patients with early stage breast cancer.[3] However, it remains unclear whether the actual treatment delay or other confounding factors actually lead to inferior outcomes.

Likewise, recent literature has investigated the time from surgery to adjuvant therapy and its potential impact on outcomes. Although delays in the initiation of adjuvant therapy beyond 90 days after surgery are known to be associated with worsened survival,[4] the literature is mixed with regard to the impact of immediate reconstruction on time to adjuvant treatment, or if immediate reconstruction is associated with delays in initiation of adjuvant treatment beyond 90 days.[4–6] Of importance, most reports originate from large academic or other tertiary care centers. Results from specific community settings are lacking, and more generalized outcomes can only be inferred from population based studies which provide lesser detail. The purpose of this study was to evaluate if immediate breast reconstruction is associated with delays to the initiation of adjuvant therapy (excluding endocrine therapy) in a community cancer center setting.

2. Methods

The Goshen Center for Cancer Care is a community based COC

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accredited cancer center which employs a breast surgical oncologist and several other surgical, medical and radiation oncologists. Breast cancer treatment planning is conducted in a weekly multidisciplinary breast meeting. Plastic surgery support is provided by two fellowship-trained surgeons in private practice.

As part of a quality improvement initiative, sequential breast cancer operations were identified from tumor registry data from March 1, 2013 to March 31, 2015. A retrospective review was conducted of patients submitted to mastectomy with or without immediate breast reconstruction. Demographic, clinicopathologic and treatment variables were collected. Operative data collection included the type of breast operation including reconstruction if performed, as well as postoperative morbidity that was graded according to the classification of Clavien and Dindo.[7]

The primary endpoint of the study was the median time to first adjuvant treatment in women with immediate reconstruction as compared to patients without reconstruction. In addition, we wished to determine if the portion of women whose adjuvant therapy was delayed past 90 days was different between groups. Chi Square testing or Fisher's exact test was used to determine significant differences in categorical variables, Mann Whitney and Student's T tests were used for non-parametric and parametric variables, respectively. A p value of 0.05 was considered significant. Statistical analysis was conducted with StatView software (Cary, NC). The institutional review board of Goshen Hospital approved this study.

3. Results

During the study period there were 271 breast cancer operations performed at our center. Of these 82 (30%) were mastectomies. Six patients were excluded after chart reviews (1 miscoded, and 5 with no follow-up documented at our center). Of the 76 remaining for analysis, 68 (89%) were performed by two surgeons (LLM, LRH), 34 (45%) underwent bilateral mastectomy and 42 (55%) were treated via unilateral mastectomy. Of the patients undergoing bilateral mastectomy, bilateral breast cancer was diagnosed in 5 (15%), thus contralateral prophylactic mastectomy was done in 29 patients (11% of all breast cancer patients.). A nipple sparing technique was employed in 15 (20%). Six of the 34 (18%) women undergoing bilateral mastectomies were diagnosed as high-risk mutation carriers around the time of their cancer diagnosis.

Immediate reconstruction was performed in 44 (58%) of patients by one of two plastic surgeons, of which 29 (66%) were bilateral reconstructions and 15 (34%) were unilateral reconstructions. Reconstruction was initiated with tissue expanders in 28 (64%), or performed as a single stage implant reconstruction in 15 (34%). One (2%) patient underwent tissue transfer reconstruction in addition to expander placement.

Compared to patients submitted to mastectomy alone, patients undergoing immediate reconstruction were more likely to undergo bilateral mastectomies (including nipple sparing procedures), to have had fewer prior breast procedures, and to be younger. There were no statistically significant differences in the groups regarding the preoperative stage, presence or absence of axillary dissection, body mass index, diabetes, vascular disease, renal disease, other comorbid conditions or smoking status at the time of operation (Table 1).

Operative complications occurred in 31 patients (41%); 20 of 44 (45%) in those undergoing immediate reconstruction versus 11 of 32 (34%) in those undergoing mastectomy alone (P=NS). Surgical site infection (SSI) and wound complications were the predominant types of complications observed in both groups. Comparing the groups with immediate reconstruction and with mastectomy alone, SSI occurred in 16% versus 13% and wound complications (flap/nipple ischemia and/or necrosis) occurred in 19% of each group. Hematoma and seroma requiring interventions were rare (<5% each). DVT occurred in 7% of immediate reconstruction patients. In patients undergoing contralateral prophylactic mastectomy ($N = 29$) as part of their surgical treatment, complications affecting the prophylactic side were seen in 4 (14%), all of which occurred in patients undergoing immediate reconstruction. Overall, complications were primarily low grade: grade 1 in 12 patients (16%) and grade 2 in 10 patients (13%). However, reoperation (grade 3b) was required in 9 patients (12%), and hospital readmission occurred in an additional two (intravenous antibiotics, anticoagulation). Prosthetic removal was required in 8 patients undergoing immediate reconstruction (18%) of which 2 occurred on the prophylactic side in women undergoing bilateral resection and immediate reconstruction. Grade three or higher complications occurred in 8 patients undergoing immediate reconstruction (18%) versus only 1 person with mastectomy alone (3%, $p = 0.07$). The rates of complications were not statistically different between groups of patients undergoing preoperative, postoperative, or no adjuvant systemic therapy ($p = 0.39$).

The criteria for consideration of preoperative or postoperative adjuvant chemotherapy, and post-mastectomy radiotherapy were in alignment with NCCN guidelines. When post mastectomy radiotherapy was administered in patients with tissue expander placement, radiation was delivered prior to placement of the permanent implant. Preoperative chemotherapy was administered to 21 of the 76 patients (28%). The first adjuvant therapy delivered after operative resection was chemotherapy in 23 (30%) at a median of 55 (range 26–170) days, radiation therapy in 20 (26%) at a median of 83 (range 18–343) days. No adjuvant chemotherapy or radiation therapy was delivered to 33 patients (43%); [not recommended (26), refused (6) or secondary to delays from prolonged complications (1)]. For the group as a whole, the median time to first adjuvant treatment was 61 days (range 18–343). In comparing those undergoing immediate reconstruction versus mastectomy alone, the median time to adjuvant chemotherapy was 59 days (36–170) versus 32 days (26–50), ($P = 0.006$); the median time to first adjuvant radiation treatment was 108 days (77–343) versus 58 days (13–960, (P=<0.001); and the median time to first adjuvant treatment was 80.5 days (36–343) versus 53.5 days (18–96), ($P = 0.003$).

Forty three patients had adjuvant therapy administered, and one did not receive adjuvant therapy at all due to prolonged operative complications. Of these, 15 (34%) were delayed past 90 days of which 14 had immediate reconstruction (Table 2). As shown in the table, immediate reconstruction was significantly related to over 90 day delays in administration of radiation therapy or any adjuvant therapy (radiation or chemotherapy), while the impact of immediate reconstruction on 90 day or greater delay in administration of systemic therapy did not reach statistical significance.

4. Discussion

Breast cancer management has become increasingly complex requiring the participation of multiple oncologic specialists and reconstructive surgeons for modern treatment planning. Mastectomy remains a common operation, and bilateral mastectomy rates are rising as are those of immediate reconstruction.[1] The literature is mixed with regard to the impact of this increased operative complexity on time to adjuvant treatment. Most reports come from large academic or nonacademic tertiary centers of excellence where differences may exist in terms of practice scope, experience, or logistical considerations and are certainly subject to publication