Published in final edited form as:

Clin Breast Cancer. 2017 April ; 17(2): e59–e64. doi:10.1016/j.clbc.2016.07.012.

Coordination of care for breast reconstruction patients: a provider survey

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Abstract

Objectives—Communication between medical oncologists (MO) and plastic surgeons (PS) is important to optimize outcomes for breast cancer patients seeking breast reconstruction. We sought to evaluate knowledge MO and PS have of each other's fields, roles expected of each other, and frequency of communication.

Methods—A cross-sectional survey was conducted in a convenience sample of MO and PS. The survey included knowledge questions about reconstruction and chemotherapy, questions about provider and patient responsibilities for timely chemotherapy initiation, and questions about communication with other specialties.

Results—MO and PS had similar knowledge scores (MO 59%, PS 56%, $p=0.5$), but both lacked knowledge about aspects of the other specialty's field related to breast reconstruction. The MO and PS agreed on the MO's degree of responsibility for timely chemotherapy initiation (MO mean 4.6, PS mean 4.4 out of 5, $p=0.2$). However, they disagreed about the PS's responsibility for timely chemotherapy initiation (MO mean 3.8, PS mean 3.0, $p=0.01$). Communication occurred about 2.5 times more often for patients with complications than uncomplicated patients ($p<0.0001$).

Conclusion—MO and PS have deficits in knowledge about each other fields and differ in their opinion regarding the burden of responsibility in ensuring timely chemotherapy initiation suggesting room for improvement in communication and understanding.

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Conflicts of interest: None

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Keywords

Breast reconstruction; coordination of breast cancer care; provider communication

Background

More breast cancer patients than ever are undergoing immediate breast reconstruction^{1–4} and adjuvant chemotherapy. Although immediate breast reconstruction is considered safe from an oncologic perspective,^{5–8} it carries a relatively high complication risk^{9,10} and has the potential to delay the initiation of chemotherapy. Breast reconstruction has a longer recovery time than mastectomy alone, and chemotherapy initiation during recovery has the potential to impair wound healing. Because of this interdependence between administration of adjuvant chemotherapy and performance of immediate breast reconstruction, communication between the medical oncologist and plastic surgeon is paramount. The need for better coordination and communication in cancer care has been well documented and described,^{11–14} but coordination around reconstruction and oncologic care has generally not been addressed.

Several potential barriers to communication exist between medical oncologists and plastic surgeons. Each specialty is unlikely to have had training related to the other field and may be unaware of important issues affecting both fields. For example, plastic surgeons generally receive minimal education about systemic therapy. Thus, they may not know which reconstruction patients are most likely to need adjuvant chemotherapy, or how reconstructive complications affect the timeliness of chemotherapy initiation. Medical oncologists generally do not receive formal education about reconstructive procedures, so they may not know how problems with healing are managed. Medical oncologists and plastic surgeons are unlikely to encounter each other during their normal workday. Further, some clinical settings may lack a multidisciplinary conference where interaction among breast providers could occur. Not having direct interaction may result in poorer communication and less appropriate care.¹⁵ High levels of communication and coordination, by contrast, are associated with more appropriate, guideline-concordant care.^{16,17}

We sought to evaluate the quality of medical oncologists' and plastic surgeons' knowledge and communication about breast cancer patients undergoing immediate breast reconstruction and adjuvant chemotherapy. Our specific objectives were three-fold: (1) to evaluate the knowledge medical oncologists and plastic surgeons have of each other's fields, relevant to breast cancer therapy/reconstruction, (2) to describe the attitudes medical oncologists and plastic surgeons have towards treatment of breast cancer patients, including responsibilities and roles in ensuring optimal care, and (3) to evaluate the self-reported practices of medical oncologists and plastic surgeons in the postoperative care of women undergoing breast reconstruction and adjuvant chemotherapy.

Methods

Study Design

The study was approved by the University of North Carolina Institutional Review Board (#10-0511). A cross-sectional survey was conducted in a convenience sample of medical oncologists and plastic surgeons. Surveys were distributed by mail and email, and at two regional professional meetings (medical oncology and plastic surgery) in the Southeast region of the United States. We included only plastic surgeons who reported performing at least one breast reconstruction per year and medical oncologists who reported treating at least five breast cancer patients per year.

Measures

The survey consisted of questions about demographics and practice characteristics, and questions in the following three domains: knowledge about immediate breast reconstruction and chemotherapy, attitudes about who is most responsible for timely chemotherapy initiation, and practice behaviors related to communication or coordination with other specialties. To develop these questions, we considered which aspects of breast reconstruction affect medical oncology practice, and which aspects of chemotherapy administration affect plastic surgery practice. The surveys for the two specialties were identical, except for some wording variation to make the question more appropriate to the respective specialty. We pilot-tested an initial draft of the surveys in convenience samples of 4 plastic surgeons and 3 medical oncologists and revised them based on their feedback. The survey is available in Appendix I.

Knowledge questions about immediate breast reconstruction—The general knowledge questions ask about the frequency of complications after immediate breast reconstruction⁹ and the frequency of clinically significant chemotherapy delays due to reconstruction. Case descriptions evaluate knowledge about when to start chemotherapy in a patient with a complication and knowledge about the management of reconstruction complications (open wound, seroma).

Knowledge questions about systemic therapy—Four case descriptions evaluate knowledge about systemic therapy. We were specifically interested in knowledge about 1) indications for chemotherapy, since this could affect healing; 2) indications for endocrine therapy, since this could affect venous thromboembolism or microvascular thrombosis risks; 3) timing of trastuzumab (Herceptin), since it is given every three weeks for a year during which additional stages of reconstruction occur; and 4) treatment after neoadjuvant chemotherapy in high-risk patients, since those patients need to have rapid healing after reconstruction in order to proceed to adjuvant radiation therapy on time.

Attitude questions—We asked participants to rate the responsibility of medical oncologists, surgical oncologists, plastic surgeons, and the patient in ensuring timely initiation of chemotherapy. We asked medical oncologists to rate the importance of immediate breast reconstruction when planning adjuvant chemotherapy, and we asked plastic surgeons to rate the importance of the likelihood of chemotherapy when planning

immediate breast reconstruction. We asked how necessary it was for the medical oncologist and plastic surgeon to communicate about a reconstruction patient scheduled to have chemotherapy.

Practice behavior questions—To evaluate practice behaviors related to communication or coordination of care, we asked medical oncologists how often they knew what type of breast reconstruction a chemotherapy patient had received, and plastic surgeons how often they knew the likelihood of chemotherapy for a reconstruction patient before surgery. We asked each specialty how often they would communicate with the other specialty about a breast reconstruction patient who needed chemotherapy, for both those who were and were not having wound healing complications.

Statistical Considerations

The knowledge measures showed general construct validity, with plastic surgeons scoring higher than medical oncologists on the questions about surgical healing, and medical oncologists scoring higher than plastic surgeons on the questions about systemic therapy. Formal validity testing, however, was not performed. One question about infection after breast reconstruction was discarded because a high percentage of plastic surgeons (35%) answered incorrectly.

Descriptive statistics were computed, and the Wilcoxon Rank Sum test for continuous variables and Fisher's Exact test for categorical variables were used for comparisons between groups. For the eight knowledge questions, missing responses and "I don't know" were considered incorrect. The frequency of answering a question correctly was compared between specialties and compared between groups using Fisher's Exact tests. A total knowledge score was computed by dividing the number of correct responses by the total number of knowledge questions. Associations between practice characteristics (monthly volume of new breast cancer patients, practice setting, and attendance at multidisciplinary conference) and total knowledge score were assessed with the Kruskal-Wallis Test. Responses to the attitude and communication items were compared between specialties using Wilcoxon Rank Sum and Fisher's Exact tests as appropriate.

Results

Sample characteristics

The sample consisted of 23 plastic surgeons (PS) and 53 medical oncologists (MO), with an overall response rate of 51% of those that received the survey in the mail, by email, or at regional professional meetings. Most participants were male (MO 60%; PS 83%) and had been practicing fewer than 20 years (MO 68%, PS 70%) (Table 1). Both specialties reported seeing an average of 6 new breast reconstruction patients per month. Most of the medical oncologists were in academic practice (57%), whereas most of the plastic surgeons were in private practice (69%). About 90% of participants in both groups reported that their institution had a multidisciplinary breast conference. Of these, more medical oncologists than plastic surgeons regularly attended the conference (100% versus 70%, $p<0.0001$).

Knowledge

The total knowledge score was slightly higher among medical oncologists (69%) compared to plastic surgeons (61%, $p=0.06$). No significant differences were seen based on age, gender, years practicing, practice setting (academic versus private-urban versus private-rural), monthly volume of new breast cancer patients, or attendance at multidisciplinary conference (all $p>0.08$).

General knowledge about breast reconstruction complications and chemotherapy delays was similar between the two specialties. Specifically, most medical oncologists (64%) and most plastic surgeons (78%, $p=0.35$) answered correctly that breast reconstruction was not associated with chemotherapy delays that affect survival⁸. However, only a minority of medical oncologists (21%) and half of plastic surgeons (48%, $p=0.03$) could estimate the approximate complication rate in the first year after immediate breast reconstruction (correct response 10–40%^{18–20}). Most participants selected “less than 10%”.

Medical oncologists showed uneven knowledge about processes of care after breast reconstruction and before the start of chemotherapy (Table 2). Specifically, 77% of oncologists did not know that the treatment for extensive breast skin necrosis is debridement and skin graft. Most oncologists (60%) did know, however, that the correct treatment for a large seroma is aspiration and drainage. Nonetheless, 17% chose “No treatment. Proceed with chemotherapy”. Most oncologists (79%) knew that tissue expansion is performed concurrently with chemotherapy.

Plastic surgeons showed uneven knowledge about indications for systemic therapy (Table 2). Specifically, 86% of plastic surgeons did not know that a patient who had received neoadjuvant chemotherapy for a triple-negative tumor did not need further systemic therapy. In fact, 55% responded that the next treatment was chemotherapy. Similarly, 70% of plastic surgeons did not know that a patient with a Her2/neu-positive tumor would need chemotherapy and trastuzumab (Herceptin), followed by trastuzumab for up to one year. Most plastic surgeons knew the proper systemic treatment for patients with a small, hormone-receptor-positive, lymph-node-negative tumor and for patients with a larger, lymph-node-positive tumor. However, most plastic surgeons (65%) did not know that chemotherapy should start 1 week after drain removal, with 26% responding that chemotherapy would start 1 month after drain removal, and 26% responding that chemotherapy would start with drains in place.

Attitudes

We asked participants to rate the medical oncologist, surgical oncologist, plastic surgeon, and patient, in terms of responsibility for ensuring timely start of chemotherapy, on a scale from 1 (not responsible at all) to 5 (completely responsible). Medical oncologists and plastic surgeons rated the medical oncologist’s responsibility as high (oncologists 4.61, plastic surgeons 4.43, $p=0.2$) and the surgical oncologist’s responsibility as somewhat high (oncologists 3.66, plastic surgeons 3.74, $p=0.99$). However, medical oncologists rated the plastic surgeon’s responsibility higher than plastic surgeons did (oncologists 3.84, plastic surgeons 3.00, $p=0.01$). Medical oncologists also rated the patient’s responsibility higher

than plastic surgeons did (oncologists 3.58, plastic surgeons 2.87, $p=0.03$). Both specialties agreed that medical oncologists and plastic surgeons should communicate about a mutual patient who is starting chemotherapy (oncologists 4.1, plastic surgeons 4.1, $p=0.83$).

Practice behaviors

We asked each specialty how much they considered reconstruction (for medical oncologists) or chemotherapy (for plastic surgeons) when planning their treatments (0–10 scale, 0=“not at all”, 10=“a great deal”). Medical oncologists did not strongly consider whether a patient had had breast reconstruction when planning chemotherapy (mean score 2.5, SD 2.5). Similarly, plastic surgeons did not strongly consider the likelihood of adjuvant chemotherapy when planning immediate breast reconstruction (mean score 3.6, SD 3.1). Medical oncologists reported knowing a patient’s type of breast reconstruction 89% of the time, on average, whereas plastic surgeons reported knowing the likelihood of chemotherapy for a reconstruction patient 62% of the time ($p<0.0001$). For a patient without a complication, both specialties reported communicating a few times over 6 months (medical oncologist mean 1.59, plastic surgeon mean 1.78, $p=0.18$). For a patient with a complication, both specialties reported communicating more frequently (medical oncologist 4.18, plastic surgeon 3.48, $p=0.65$; comparison of uncomplicated to complicated $p<0.001$).

Discussion

In this sample of medical oncologists and plastic surgeons who treat breast cancer patients, providers from both specialties had substantial knowledge deficits and differed in their attitudes about responsibilities regarding patient care. Both specialties lacked knowledge about basic processes of care specific to the other field, and each group reported infrequent communication with the other specialty, except when a patient had complications.

The underestimation of complication rates after breast reconstruction by both specialties has important implications for patient care and provider training. Not all studies have shown a delay in receipt of adjuvant chemotherapy for immediate breast reconstruction patients;²¹ however, when surgical complications occur for immediate breast reconstruction patients, subsequent adjuvant therapy is delayed.²² While oncologic outcomes for patients both with and without surgical complications may not differ in most cases, Coordination of care across specialties could help reduce delays when complications arise providing better continuity of care for the patient. Academic oncologists and plastic surgeons have an opportunity to educate their trainees about coordination and communication with other specialties but may choose not to if they believe the risk of complications is low. We were somewhat surprised that plastic surgeons underestimated breast reconstruction complication rates, since they take care of those complications. This may be an example of optimism bias, in which people tend to overestimate their own qualities or abilities.²³ Medical oncologists may have underestimated complication rates because they tend to see breast reconstruction patients after surgical complications have resolved and have become less memorable.²⁴

The knowledge deficit that each specialty had about the other specialty has important implications for the timeliness of chemotherapy initiation. If medical oncologists knew appropriate treatment regimens for a large area of skin necrosis, they could actively discuss

this with the plastic surgeon to facilitate timely chemotherapy initiation. Similarly, most plastic surgeons did not know how drains affect chemotherapy initiation. The correct response - waiting one week after drain removal - allows the provider to check for seroma formation prior to starting chemotherapy.²⁵⁻²⁷ These misconceptions reflect a lack of understanding by plastic surgeons about the importance of timely drain removal which could result in chemotherapy treatment delays.

Knowledge deficits about the other specialty also could affect timing for subsequent stages of surgery. More patients than ever are undergoing neoadjuvant chemotherapy and immediate reconstruction prior to radiation.^{19,28-30} Patients who have all of these treatments must have full range of motion of the arms and complete expansion of a tissue expander or complete healing of a flap prior to radiation, which commonly starts 6 weeks after surgery. Based on current standard of care, such a patient would generally not receive more chemotherapy unless on a clinical trial and would have little time for healing before radiation would need to start. Additionally, knowledge of trastuzumab administration schedule helps to prevent surgical procedures from interrupting the treatment plan and facilitates continuity of care across specialties.

Medical oncologists would benefit from knowing that plastic surgeons feel less responsible for timely chemotherapy initiation, so that they can proactively involve the plastic surgeon in making sure a patient is healed in time for chemotherapy. An increase in communication between providers early in treatment planning would help alleviate some of these issues and improve patient care.

The infrequent communication between medical oncologists and plastic surgeons seen in this study may be inadequate in cases where the patient is high-risk oncologically, surgically, or both. Communication between the medical oncologist and other providers may be particularly important, however, since patients hold their oncologists primarily responsible for communication among their breast cancer providers.³¹ Such interdisciplinary communication and coordination of care would be more likely to occur in a multidisciplinary breast conference or tumor board.^{16,17} One third of the plastic surgeons (36%) in our sample, however, did not regularly attend multidisciplinary conference. Insufficient communication among providers can create confusion about management plans and could undermine the patient's confidence in the treatment team. Important information may not be appropriately relayed to the patient, resulting in delays and unnecessary anxiety.³²

This study had some limitations. We developed *ad hoc* measures of knowledge, attitudes, and communication practices. The measures had general acceptability in informal testing with providers from both specialties and showed basic face validity. Nonetheless, actual validity and reliability were not formally tested. In particular, we do not know whether or not the questions that showed very low knowledge levels were too difficult. While we would not expect providers to know everything about the other specialty, we would hope that knowledge would be greater than what we found in this study. We also acknowledge that minor differences in practices may exist, and that some issues are patient-specific, which may explain differing answers on some questions. We also acknowledge that the providers

included in this survey may not be representative of all breast care providers. In general, providers in this cohort may see more breast cancer patients than the average provider. Respondents could have looked up the correct answers to the knowledge questions, although the low level of knowledge for many of the questions suggests otherwise. The measurements of communication and coordination practices were self-reported. We would expect self-reported practices to generally result in inflation of responses in the direction of greater communication and coordination of care.

The provider samples were convenience samples and somewhat homogeneous within each specialty (mostly academic for the medical oncologists, mostly private practice for the plastic surgeons), so our findings may not be generalizable to all providers in all practice settings.

Conclusion

Medical oncologists and plastic surgeons had substantial deficits in knowledge about each other's fields and differed in their opinions about the burden of responsibility in ensuring timely chemotherapy initiation. Although both medical oncologists and plastic surgeons increased their communication when complications arose, these results suggest room for improvement in communication and understanding particularly in patients with an uncomplicated course of care, which could improve the care of breast cancer patients who undergo immediate breast reconstruction and chemotherapy.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors would like to thank all of the clinicians that took the time to complete this survey.

Funding

Clara Lee was supported by NIH/NCI K07CA154850-01A1.

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Clinical practice points

It has been well documented that cancer patients would have more timely care if there was better communication and coordination among providers. Breast cancer treatment is often complex and requires special expertise from multiple types of providers increasing the need for coordinated care. In general, coordination around breast reconstruction and oncologic care has not been addressed. This study found that medical oncologists and plastic surgeons had limited knowledge about the treatment course of the other's specialty which could contribute to delays in care and poorer patient outcomes. They also disagreed about the level of responsibility each had in ensuring timely chemotherapy initiation, and they often failed to communicate regularly about a patient's course of treatment unless complications arose. Identifying these gaps in understanding of treatment course, understanding each provider's responsibility in timely care, and increasing communication about a patient's treatment could improve patient care and enhance safety of breast reconstruction.

Table 1

Characteristics of Responders

Characteristics of Responders	Total n=76*	Plastic Surgeons n=23	Medical Oncologists n=53	p value
<i>Age</i>				0.31
30 – 49	45	16 (69.6%)	29 (55.8%)	
50+	30	7 (30.4%)	23 (44.2%)	
<i>Gender</i>				0.07
Female	25	4 (17.4%)	21 (41.3%)	
Male	50	19 (82.6%)	31 (59.6%)	
<i>Years in Practice</i>				0.99
0 – 19 years	52	16 (69.6%)	36 (67.9%)	
20+ years	24	7 (30.4%)	17 (32.1%)	
<i>Number of new breast cancer patients per month</i>				0.58
Mean (SD)		6.37 (5.65)	5.65 (6.07)	
<i>Practice Setting</i>				0.01
Academic	37	7 (30.4%)	30 (56.6%)	
Private practice in rural area	10	1 (4.3%)	9 (17.0%)	
Private practice in urban/suburban area	29	15 (65.2%)	14 (26.4%)	
<i>Multidisciplinary attendance**</i>				<0.0001
Never	6	6 (30.0%)	0 (0.0%)	
1 – 3 times/month	32	13 (65.0%)	19 (43.2%)	
Every week	26	1 (5.0%)	25 (56.8%)	

* Not all respondents answered all questions.

** For those who had a multidisciplinary clinic available (n=64)

Abbreviations: SD standard deviation

Table 2**Knowledge**

Knowledge Question (correct answer)*	Medical Oncologists n=53	Plastic Surgeons n=23
What is the treatment for T2N2M0 ER/PR+, HER2- (Chemo followed by endocrine therapy)	53 (100%)	20 (87%)
What is the treatment for T1aN0M0, ER/PR+, HER2- (Endocrine therapy alone)	51 (96%)	17 (74%)
What is the treatment for T2N1M0, ER/PR-, HER2+ (Chemo with Trastuzumab followed by Trastuzumab up to 1 year)	53 (100%)	7 (30%)
What is the treatment for T3N1M0, ER/PR-, HER2-, already received neoadjuvant (No further systemic therapy)	45 (85%)	3 (13%)
Time between drain removal and chemo initiation? (1 week)	31 (59%)	8 (35%)
When is tissue expansion performed? (May be done during chemotherapy)	41 (77%)	22 (96%)
Treatment of breast skin necrosis (Debride and close with skin graft)	12 (23%)	16 (73%)
Treatment of large seroma in donor site (Aspirate or percutaneous drain)	31 (60%)	22 (100%)
Breast reconstruction complication rate resulting in admission or procedure (10–40%)	11 (21%)	11 (48%)

* Some questions and answers have been shortened to fit this table

Abbreviations: chemo=chemotherapy