

Correlates of Referral Practices of General Surgeons to Plastic Surgeons for Mastectomy Reconstruction

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BACKGROUND. General surgeons' attitudes toward breast reconstruction may affect referrals to plastic surgeons. The propensity to refer to plastic surgeons prior to surgical treatment decisions for breast cancer varies markedly across general surgeons and is associated with receipt of reconstruction. In this study, the authors used data from a large physician survey to examine factors associated with general surgeons' propensity to refer breast cancer patients to plastic surgeons prior to mastectomy.

METHODS. The authors surveyed all attending general surgeons (N = 456 surgeons) from a population-based sample of breast cancer patients who were diagnosed in Detroit and Los Angeles during 2002 (N = 1844 patients), with a surgeon response rate of 80%. The dependent variable was surgeon report of the percentage of their mastectomy patients in the past 2 years who they referred to plastic surgeons prior to initial surgery (referral propensity). Referral propensity was collapsed into 3 categories (<25%, 25–75%, and >75%) and regressed on the following covariates using logistic regression: Surveillance, Epidemiology, and End Results registry; number of years in clinical practice; surgeons' sex; annual breast surgery volume; and hospital setting.

RESULTS. Only 24% of surgeons referred >75% of their patients to plastic surgeons prior to surgery (high referral propensity). High referral propensity was associated independently with surgeons who were women (odds ratio [OR], 2.3; *P* = .03), high clinical breast surgery volume (OR, 4.1; *P* < .01), and working in cancer centers (OR, 2.4; *P* = .01). High-referral surgeons and low-referral surgeons also had different beliefs about women's preferences for reconstruction, with the low-referral surgeons perceiving more access barriers (cost, availability of plastic surgeons) and a lower patient priority for reconstruction.

CONCLUSIONS. A large proportion of surgeons do not refer breast cancer patients to plastic surgery at the time of surgical decision-making. Surgeons who have a high referral propensity are more likely to be women, to have a high clinical breast volume, and to work in cancer centers. These data support the importance of comanagement through multidisciplinary care models. Women need more opportunities to discuss reconstructive options to make informed surgical treatment decisions about their breast cancer. *Cancer* 2007;109:1715–20. © 2007 American Cancer Society.

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Less than 20% of eligible patients undergo breast reconstruction after treatment for breast cancer, despite documented quality-of-life benefits of the procedure.^{1–3} Considerably lower rates of reconstruction have been observed in many geographic regions and in nonwhite racial and ethnic subgroups, which has motivated con-

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cerns about access to treatment.³ In response, the Women's Health and Cancer Rights Act (WHCRA) was passed in 1998: it is a federal law that mandates insurance coverage of breast reconstruction.⁴ However, the law has not increased the overall use of reconstruction or reduced variations across geographic regions and patient subgroups.⁵ This suggests that factors other than insurance coverage are driving practice patterns.

The literature has illuminated patient-level factors that are associated with use of reconstruction. Older, non-Caucasian women with more advanced cancer stage are less likely to receive breast reconstruction.^{3,6} In addition, compared with Caucasian women, African-American women are significantly more likely to report that reconstruction was not recommended to them or that they did not have enough knowledge to make an informed decision about it.⁶ Much less is known about provider and organizational factors associated with patients' receipt of breast reconstruction. Hawley et al. showed that a surgeon's propensity to refer their patients with breast cancer to a plastic surgeon prior to surgical cancer treatment explained a substantial amount of between-surgeon variation in the use of reconstruction.⁷ This suggested that surgeons' attitudes and practice factors may be important sources of variation in reconstruction. To examine these issues further, we used a surgeon survey that accompanied a large, population-based study 1) to describe surgeon and practice-level factors associated with a general surgeons' propensity to refer their breast cancer patients to a plastic surgeon for consultation about reconstruction prior to mastectomy and 2) to describe general surgeons' perceptions about why women do not seek breast reconstruction.

MATERIALS AND METHODS

Study Population

We performed a survey of a population-based sample of 2645 women with breast cancer who were diagnosed in the metropolitan areas of Detroit and Los Angeles during the period from December 2001 to January 2003. The details of this study are reported elsewhere.⁸ In brief, all patients with ductal carcinoma in situ and an approximate 20% random sample of patients with invasive (but not metastatic) disease were accrued into the sample during the study period. Pathology reports were used to identify 1 or more surgeons (N = 456 surgeons) for 98.5% of the patient sample.

Surgeons were contacted by mail and were asked to participate in a brief, self-administered survey to

evaluate their perspectives about the surgical treatment for breast cancer. Surgeons subsequently were mailed a questionnaire and a gift. We followed the Dillman method to maximize response rates in the mailed survey,^{9,10} which involved a postcard reminder and subsequent mailings to nonresponders. The response rate was 80% (N = 365 surgeons): Three hundred fifty-five surgeons completed the written questionnaire, and 10 surgeons completed an abbreviated telephone survey. Surgeons were informed about the study goals and methods, and the protocol was approved by the Institutional Review Boards of the University of Michigan, Wayne State University, and the University of Southern California.

Measures

The dependent variable was referral propensity to plastic surgery prior to mastectomy. Surgeons were asked to indicate the percentage of their patients in the past 2 years who were considering mastectomy who they referred to a plastic surgeon prior to initial surgery (<25%, 25% to 49%, 50% to 75%, or >75%). The middle 2 groups were combined in this analysis to create 3 categories of referral propensity: low, moderate, and high. For the logistic regression, we categorized referral propensity further into low (low and moderate) versus high.

The independent variables included 1) Surveillance, Epidemiology, and End Results (SEER) registry (Detroit vs Los Angeles); 2) surgeon characteristics (sex, years in practice since residency); 3) surgeon volume (the number of definitive breast cancer surgery procedures per year); and 4) hospital practice setting (cancer center, teaching hospital, community hospital). Years in practice was self-reported and was analyzed as a continuous variable. To measure clinical breast volume, we recoded the reported number of total breast procedures in the past year into 3 categories of near equal distribution: low (<20 procedures per year), medium (21–50 procedures per year), and high (>50 procedures per year). Varying the cut-off ranges did not substantively change the results. Surgeon practice affiliation was categorized as a cancer center, teaching hospital, or community hospital based on surgeon self-report. Because surgeons could choose more than 1 practice setting, we applied the following algorithm to assign surgeons to a primary setting: cancer center (alone or with either teaching or community setting), teaching setting (teaching hospital without cancer center but with or without community hospital), or community hospital (with community hospital the only setting category indicated).

Analysis

First, we described the distribution of referral propensity (3 categories) across all independent variables. Then, we regressed surgeon referral propensity (2 categories) on selected covariates using logistic regression. Wald tests and the likelihood-ratio test were used to test the significance of individual predictive variables, and the model chi-square statistic was applied to test the overall significance of the model. All analyses were performed with STATA software (version 8.0).

RESULTS

Table 1 shows the study sample characteristics. The mean surgeon age was 49.4 years, 14.4% of surgeons were women, and they had a mean of 17.2 years in practice. On average, surgeons reported that they devoted 31.3% of their total practice to breast cancer. There was a wide distribution of annual procedure volume by surgeon: 28.5% reported that they performed ≤ 20 definitive breast surgeries per year; and 31.0% performed >50 procedures per year. Approximately 50% of surgeons practiced in a community hospital setting alone, 33% practiced in a teaching hospital, and 18.8% practiced in a cancer center.

Table 2 describes the distribution of general surgeons' referral propensity to plastic surgery for breast reconstruction across selected demographic and clinical variables. SEER registry, surgeon sex, procedure volume, and hospital setting were associated significantly with referral practice. Table 3 shows the independent association of covariates with referral propensity categories. High-referral surgeons were more likely to be women (odds ratio [OR], 2.30; $P = .03$), to have high clinical breast surgery volume (OR, 4.08; $P < .01$), and to work in cancer centers (OR, 2.41; $P = .01$).

Table 4 describes general surgeons' beliefs about why women do not receive breast reconstruction. Many surgeons believed that patients did not undergo reconstruction because of a lack of *patient desire*. Specifically, 57% of surgeons believed that reconstruction was not important to patients; 64% believed that patients were not interested; and 39% believed that patients were concerned that reconstruction would take too long. However, nearly half of surgeons (46%) reported that patients were concerned about the cost of the procedure. Table 4 also describes the distribution of surgeon beliefs about why women do not receive breast reconstruction across referral propensity categories. There were few differences across referral propensity categories in surgeon beliefs related to *patient desire* for reconstruction.

TABLE 1
Study Sample Characteristics (N = 365)

Variable	No.	Percentage
Site		
Detroit	138	37.8
Los Angeles	227	62.2
Mean age (range), y	49.4 (30–79)	
Years in practice, mean (range)	17.2 (1–49)	
≤ 10	108	30.2
11–20	115	32.1
21–49	135	37.7
Sex		
Women	53	14.4
Men	312	85.6
Race		
White	237	64.9
Black	15	4.1
Hispanic	16	4.4
Asian	70	19.2
Other	27	7.4
Hospital practice setting		
Cancer center	69	18.8
Teaching hospital	120	33
Community hospital	176	48.2
No. of breast surgeries per y		
≤ 20	104	28.5
21–50	135	37
>50	113	31
Missing	13	3.5
Mean percentage of breast cancer surgeries (range)		31.3 (2–100)
Percentage other oncology		16.2 (0–70)
Percentage nononcology		52.5 (0–95)

Similarly, there was little difference across referral propensity categories in surgeon beliefs that patients commonly voiced concerns that reconstruction would take too long. By contrast, there were marked differences across surgeon referral propensity categories in surgeon beliefs related to potential patient *access barriers*, such as inadequate knowledge (32%, 16%, and 12% for low, moderate, and high referral propensity categories, respectively; $P < .001$), concerns about cost (58%, 47%, and 22% for low, moderate, and high referral propensity categories, respectively; $P < .001$), and unavailability of plastic surgeons (30%, 13%, and 8% for low, moderate, and high referral propensity categories, respectively; $P < .001$). There also were marked differences across propensity referral categories in surgeon beliefs about *patient priorities* for treatment. In particular, 31%, 13%, and 12% of surgeons in the low, moderate, and high referral propensity categories, respectively ($P < .001$), believed that patients were too preoccupied with other elements of their cancer therapy to consider reconstruction.

Several other themes emerged from an open ended question about why women do not choose

TABLE 2
Distribution of Plastic Surgery Referral Propensity Across Selected Surgeon Characteristics (N = 342)*

Variable	Percentage of surgeons			P [†]
	Low-referral surgeons, n = 152	Moderate-referral surgeons, n = 109	High-referral surgeons, n = 81	
SEER registry				.001
Detroit	53	31	31	
Los Angeles	47	69	69	
Years in practice				.23
≤10	24	32	38	
11–20	32	32	29	
21–49	44	36	33	
Sex				<.001
Men	95	82	70	
Women	5	18	30	
Clinical breast volume [‡]				<.001
Low	33	35	11	
Medium	42	35	38	
High	25	30	51	
Hospital setting				<.001
Community	51	33	34	
Teaching	25	42	35	
Cancer center	9	22	30	

SEER indicates Surveillance, Epidemiology, and End Results.

* Twenty-three surgeons had missing data on referral practice.

† Pearson chi-square test for differences in the distribution of referral propensity across the selected variables.

‡ Low-referral surgeons referred <25% of breast cancer patients to a plastic surgeon prior to mastectomy; moderate-referral surgeons referred 25–75% of patients; and high-referral surgeons referred >75% of patients.

TABLE 3
Multivariate Analysis of Correlates of a High-Referral General Surgeon*

Independent variable	Adjusted OR (95% CI)	P
SEER registry [†]	1.50 (0.81–2.76)	.20
Years in practice [‡]	0.99 (0.96–1.02)	.40
Women [§]	2.30 (1.09–4.84)	.03
Clinical breast volume		
Low	1.0	—
Medium	2.98 (1.30–6.82)	.01
High	4.08 (1.76–9.42)	<.01
F test (chi-square = 10.9)		<.01
Hospital setting		
Community hospital	1.0	—
Teaching hospital	1.73 (0.89–3.36)	.10
Cancer center	2.41 (1.16–5.04)	.01
F test (chi-square = 5.6)		.05

OR indicates odds ratio; 95% CI, 95% confidence interval; SEER, Surveillance, Epidemiology, and End Results.

* High-referral surgeons were defined as those who referred >75% of breast cancer patients to plastic surgery for reconstruction.

† Detroit was the reference group.

‡ Continuous variable.

§ Men were the reference group.

|| Reference group.

reconstruction: poor reconstructive options (specifically, the abdominal wall complications with transverse rectus abdominis musculocutaneous flaps, the fear of silicone, and the poor cosmetic results with breast implants), the risk that reconstruction may delay adjuvant therapy, and the social stigma of having a *cosmetic* procedure. In addition, several surgeons mentioned difficulty with health maintenance organization coverage of procedures despite local and federal legislation and patient advocacy letters.

DISCUSSION

In this large, population-based study, we observed that almost half of surgeons (44%) referred <25% of women to plastic surgery prior to the mastectomy. High-referral surgeons were more likely to be women, to have a high clinical breast surgery volume, and to work in cancer centers. Surgeon attitudes about why women do not receive breast reconstruction varied systematically. Low-referral surgeons were more likely to perceive access barriers to receiving reconstruction and lower patient priorities for reconstruction; but there was little difference across surgeons with

TABLE 4
Surgeons' Perceptions of Why Women Do Not Chose Breast Reconstruction by Surgeon Referral Practice to Plastic Surgery for Breast Reconstruction

Surgeons' perception	Responded "very common," %*				P
	All surgeons, N = 342 [†]	Low-referral surgeons, n = 152 [‡]	Moderate-referral surgeons, n = 109 [‡]	High-referral surgeons, n = 81 [‡]	
Patient desire					
No desire for more surgery	64	62	70	60	.32
Not important	57	58	58	53	.67
Requires too much time	39	30	51	40	<.01
Patient concern					
Concerned about cancer surveillance	25	24	30	19	.19
Concerned about the look or feel of the reconstruction	15	16	17	9	.21
Access barriers					
Concerned about cost	46	58	47	22	<.001
Not enough knowledge about reconstruction	22	32	16	12	<.001
Unavailability of plastic surgery	19	30	13	8	<.001
Patient priorities					
Focused on breast cancer treatment, not reconstruction	21	31	13	12	<.001

* Responded 4 or 5 on a 5-point Likert scale, from very uncommon (1) to very common (5).

[†] Twenty-three surgeons had missing data on referral practice.

[‡] Low-referral surgeons referred <25% of breast cancer patients plastic surgeon prior to mastectomy; moderate-referral surgeons referred 25–75% of patients; and high-referral surgeons referred >75% of patients.

^{||} Chi-square tests were used to evaluate the differences in response by referral practice.

regard to their perceptions of patient desire for the treatment.

We can only speculate about whether these differences in referral practices across surgeons are driven by patient preferences, surgeons' attitudes toward treatment options, or practice barriers to comanagement. Results pertaining to surgeons' attitudes suggest that practice barriers may play an important role. Compared with high-referral surgeons, low-referral surgeons were significantly more likely to perceive that patient finances and availability of reconstructive services diminished opportunities for reconstruction. These attitudes may indicate that low-referral surgeons are more likely to treat patients with limited resources or to practice in settings with limited access to plastic surgeons. Our observation that, compared with higher referral surgeons, low-referral surgeons were more likely to perceive that low patient knowledge was a reason they did not receive reconstruction suggests that patient education level and/or resources devoted to patient education may be lower in their practices. The finding that low-referral surgeons were more likely to believe that women were more focused on other cancer treatments than reconstruction suggests that resources devoted to coordination of treatment may be more

limited in these practices. By contrast, there were no differences across surgeons in beliefs about the role of patient desire in the receipt of reconstruction. This suggests that patient interest in reconstruction may be similar across surgeon practices.

Limitations

Our findings should be interpreted in the context of some limitations. Our estimates may have been biased by nonresponse, and we had little information about nonresponding surgeons. However, the response rate of 80% was excellent for a physician survey. We believe that the surgeon sample is representative of all surgeons practicing breast cancer care in the 2 metropolitan areas during the study period, because they were identified through a population-based sample of patients. However, we likely missed some surgeons, particularly those with a low breast surgery volume. These results also are limited to the 2 metropolitan areas and may not reflect national trends in breast cancer care. In addition, practice information was derived from self-report and is subject to respondent recall. However, surgeons' recall of procedure volume was correlated highly with the number of patients treated in our patient study. In addition, this study addresses referral to a plastic surgeon at the time of breast cancer diagnosis and does not include

surgeon referrals after the initial course of breast cancer treatment. Finally, we do not have information on hospital practice attributes, such as patient volume, or patient attributes, such as stage of disease, which may be independent predictors of reconstructive referral practices.

Implications

Our results have important implications for patient care and policy. Prior research suggests that low rates of breast reconstruction reflect unmet need, especially in vulnerable populations. Our findings indicate that there are systematic differences among surgeons with regard to referral to plastic surgeons prior to surgical decisions for patients with breast cancer. Patient decision aids that include information about reconstruction¹¹ or comanagement of patients through a multidisciplinary approach may improve patient knowledge about all surgical options and aid in this complex decision-making process. Referral to a plastic surgeon prior to initial surgical decision also may influence this decision; for example, women may be more inclined to choose mastectomy with a good understanding of the reconstructive options. However, our results suggest that barriers to comanagement may exist, especially in smaller surgical practices, which may have a more challenging patient mix and limited resources. The acceptance of multidisciplinary breast cancer treatment as a practice model, coupled with advances in breast reconstruction in the past 2 decades, should motivate strategies to enhance the involvement of plastic surgeons in the education and treatment counseling of patients with newly diagnosed breast cancer.

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