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Does a Multidisciplinary Approach to Invasive Breast Cancer Care Improve Time to Treatment and Patient Compliance?

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Abstract

Purpose: This study aimed to evaluate whether comprehensive multidisciplinary care (cMDC) for breast cancer patients affected time from diagnosis to treatment, compliance with appointments and to assess for racial disparities.

Methods: This institutional review board approved retrospective study included adult patients diagnosed with invasive breast cancer between February 2015 and February 2017 and treated at an academic health system where the cMDC program was implemented in February 2016. The cMDC and non-cMDC groups as well as black and white patients were compared to assess time from diagnosis (date of pathology result indicating invasive breast cancer) to treatment (date of surgery or chemotherapy). Compliance was measured by appointments characterized as “no shows” or “canceled due to personal reasons” in the electronic medical record.

Results: Of 541 patients (419 cMDC and 122 non-cMDC), mean time from diagnosis to treatment was significantly longer for blacks than whites in the non-cMDC group (46.9 ± 64.6 days vs 28.2 ± 14.8 days, $p = 0.024$) and the cMDC group (39.9 ± 34.1 days vs 31.4 ± 16.3 days, $p = 0.001$). Of 38 (7.2%) patients who started treatment > 60 days after diagnosis, 25 (65.8%) were

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CONFLICT OF INTEREST STATEMENT

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black. Implementation of cMDC significantly improved patient compliance (missed appointments 4.9 ± 7.6 non-cMDC vs 3.2 ± 4.6 cMDC, $p = 0.029$).

Conclusion: Use of cMDC for invasive breast cancer at our institution highlighted an area for improvement for care administered to blacks and improved patient compliance with appointments.

Keywords

Multidisciplinary care; Racial disparity; Breast cancer management; Compliance; Standard of care

INTRODUCTION

Care provided for breast cancer patients has evolved to include a multidisciplinary approach.¹⁻⁴ Multidisciplinary care (MDC) involves representation from all health professionals who contribute to decision-making on management plans.⁵ Studies assessing adherence to multidisciplinary tumor board recommendations indicate strong adherence and less deviance over time.⁶ Results on the effect of MDC on patients are mixed. Some studies found no changes in patient mortality or cost of care, while others demonstrated improved quality of life for people with advanced disease.⁷⁻¹¹ In lung cancer management, MDC led to decreased time from presentation to initiation of treatment.^{12,13} More favorable outcomes are associated with shorter times to diagnosis and treatment.¹⁴ To make recommendations, various cancer providers must evaluate and assess each patient, which increases the number of visits required per patient. Formation of MDC teams has led to fewer provider visits and decreased resources used to diagnose and stage cancer.^{12,13} Unfortunately, challenges still exist in the management of breast cancer patients, including addressing disparities based on race and socioeconomic status.^{15,16} Limited data exist on the effect of multidisciplinary tumor board recommendations on patient compliance in breast cancer management.

Our academic health system implemented a comprehensive multidisciplinary care (cMDC) program for invasive breast cancer in February 2016. The program involves two sites, one urban and one suburban, with tumor board discussion held weekly on different days by site, and scheduling patients to see each provider recommended by the tumor board on the same day that their case is discussed. This study aimed to evaluate whether cMDC for breast cancer patients affected time from diagnosis to treatment, compliance with appointments and to assess for racial disparities.

MATERIALS AND METHODS

This retrospective study included patients, 18 and older, diagnosed with invasive breast cancer and treated between February 2015 and February 2017 at our institution's suburban and urban sites. The cMDC program was implemented in February 2016, thus patients diagnosed with invasive breast cancer after its implementation were assigned to the cMDC group and patients diagnosed prior to its implementation were assigned to the non-cMDC group. Exclusion criteria included patients treated at outside institutions or other satellite sites within the health system, and those with metastatic and noninvasive disease. The study was approved by the health system's institutional review board.

Patients were also subcategorized by race/ethnicity. The primary outcome, time of diagnosis to treatment, was compared across both groups. Time of diagnosis was defined as the date of the pathology result indicating invasive breast cancer, and time of treatment was defined as the date of an initial surgical procedure or chemotherapy infusion. The secondary outcome, patient compliance, was measured by missed appointments using the proxy of the number of appointments characterized as “no shows” or “canceled due to personal reasons” in the electronic medical record.

Statistical analysis

To attain a two-sided power of 80% allowing for a 5% type 1 error rate, a minimum sample size of 163 patients was calculated for this study. Group comparisons were made using chi-square tests for the non-sparse categorical data, Fisher’s exact test for the sparse categorical data, and Wilcoxon signed rank test for the non-normally distributed numerical data. Analyses used SPSS Statistics (IBM, Armonk, NY) with significance set at $p < 0.05$.

RESULTS

Of the 541 patients who met inclusion criteria, the cMDC group included 419 patients and the non-cMDC group included 122 patients. Overall, 242 patients were treated at the suburban site and 299 patients at the urban site. Average age was 61 years old. Race was self-reported by 540 patients: 280 white, 233 black, 18 Asian, 6 Hispanic, 1 Middle Eastern, and 2 “other.” Race analyses included only white and black patients.

Time from diagnosis to treatment

The mean time from diagnosis to treatment for cMDC vs non-cMDC groups was not significantly different (34.7 ± 25.6 days vs 36.7 ± 46.4 days, respectively; $p = 0.130$) (Table 1). When analyzing by race, the mean time from diagnosis to treatment was significantly longer for blacks than whites in both groups: non-cMDC group was 46.9 ± 64.6 days vs 28.2 ± 14.8 days ($p = 0.024$; Table 2) and cMDC group was 39.9 ± 34.1 days vs 31.4 ± 16.3 days ($p = 0.001$; Table 3). No significant difference in mean time to treatment was found when assessing only white patients across both groups (Table 4) or only black patients (Table 5) across both groups.

When categorizing time from diagnosis to treatment as ≤ 60 days or >60 days, 488 patients (92.8%) started treatment within 60 days compared to 38 (7.2%) who started treatment after 60 days from diagnosis (Table 6). Of those 38 patients, 25 (65.8%) were black.

In the non-cMDC group, there were significantly more white patients treated ≤ 60 days (57 [98.3%]) than black patients (48 [85.7%]), and significantly more black patients were treated > 60 days (white 1 [1.7%] vs black 8 [14.3%]) ($p = 0.016$; Table 2). This difference was no longer noted in the cMDC group.

Missed appointments/compliance

Using the mean number of missed appointments, patient compliance significantly improved after implementation of cMDC (3.2 ± 4.6 vs non-cMDC 4.9 ± 7.6 , $p = 0.029$; Table 2). For

the cMDC group, white patients missed significantly less appointments than black patients (2.7 ± 4.8 vs 3.9 ± 4.6 , $p = 0.001$; Table 3) whereas no difference was found between the races in missed appointments in the non-cMDC group. When comparing each race separately, white patients missed significantly less appointments in the cMDC group (2.7 ± 4.8 vs non-cMDC 4.2 ± 5.5 , $p = 0.010$; Table 4) but no significant change was noted for black patients (non-cMDC 5.4 ± 9.1 vs cMDC 3.9 ± 4.6 , $p = 0.918$) (Table 4).

DISCUSSION

This retrospective review of over 500 patients who received breast cancer care before and after implementation of a cMDC program found no statistically significant improvement in time from diagnosis to treatment associated with cMDC. Although there is no exact recommended time from diagnosis to initial treatment, research has demonstrated that treatment initiated within 60 days of diagnosis is associated with better prognosis.^{14,17} The majority of our patients received treatment within 60 days before (92.4%) and after (92.9%) implementation of cMDC. The variance of the cMDC group was less than that of the non-cMDC group, indicating that distribution of the time frame to start treatment was much narrower following implementation of cMDC. This may indicate a more uniform approach to management of breast cancer patients with cMDC.

Racial disparities have been noted in the management of breast cancer.¹⁶ Of our 38 patients who started treatment >60 days after diagnosis, the majority were black. While implementation of cMDC showed a 4.3% decrease for black patients with >60 days time to treatment, this improvement was not statistically significant. Black patients in both the non-cMDC and cMDC groups showed significantly longer times from diagnosis to treatment than whites. The gap in time to treatment between the races shortened with implementation of cMDC (18.7 days–8.5 days), but this improvement was not significant (two-way analysis of variance, $p = 0.371$). Therefore, although the difference across races moved from a clinically significant time frame of diagnosis to treatment of >60 days, to a non-clinically significant timeframe of >30 days in the cMDC group, these findings highlight an opportunity to improve our cMDC program.

While black patients missed more appointments than white patients after implementation of cMDC, our study did not assess whether the first appointments for treatment were missed, affecting time to treatment, or why appointments were missed. Further studies are needed to assess the barriers that contribute to the delay to treatment found among black patients.

Use of a multidisciplinary cancer care program has been associated with better clinical outcomes with evidence of improved survival among breast cancer patients.¹⁸ The impact of MDC on patient compliance in cancer management has not been widely studied. Evidence shows that a multidisciplinary team improves patient compliance in the management of other chronic diseases such as diabetes.^{19–21} Like ours, most multidisciplinary teams involve nurses or mid-level providers who telephone patients to ensure appropriate follow-up. Based on the number of missed/cancelled appointments in our study, overall patient compliance improved significantly following cMDC implementation.

A surprising finding in regards to patient compliance was that no racial differences occurred in missed appointments before implementation of cMDC, only after. Why the cMDC approach might affect missed or cancelled appointments for black patients requires study to identify barriers to overcome.

Strengths of the study include adequate sample size to assess for significant differences. Weaknesses include not further analyzing if the missed appointments were sporadic or occurring in clusters as well as if it was the first appointment to initiate treatment. Missed/cancelled appointments may be overestimated because if the patient rescheduled and subsequently attended the rescheduled visit, then that action does not imply noncompliance.

CONCLUSION

This single-institution study demonstrated that implementation of cMDC for patients with invasive breast cancer did not affect time from diagnosis to treatment but significantly improved patient compliance overall. Our findings showed racial disparity with blacks having longer times from diagnosis to treatment and more missed or cancelled appointments than whites. Further studies are needed to assess factors contributing to the racial disparity and strategies to alleviate them.

IMPLICATIONS

Multidisciplinary care programs do improve clinical outcomes and this study demonstrated it improves compliance as well. It did not overcome racial disparities observed in the time from treatment to diagnosis; further investigation of the barriers that exist is needed in order to propose strategies to alleviate them.

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Abbreviations:

cMDC	comprehensive multidisciplinary care
MDC	multidisciplinary care

REFERENCES

1. Halsted WSI (1907). The results of radical operations for the cure of carcinoma of the breast. *Ann Surg*, 46, 1–19. [PubMed: 17861990]
2. Fisher B, & Fisher ER (1966). The interrelationship of hematogenous and lymphatic tumor cell dissemination. *Surg Gynecol Obstet*, 122, 791–798. [PubMed: 5934190]
3. Shuster TD, Girshovich L, Whitney TM, & Hughes KS (2000). Multidisciplinary care for patients with breast cancer. *Surg Clin North Am*, 80, 505–533. [PubMed: 10836005]
4. Rabinowitz B (2004). Interdisciplinary breast cancer care: declaring and improving the standard. *Oncol (Williston Park)*, 18, 1263–1268. discussion 1268–1270, 1275.
5. Kaufman CS (2004). Breast care is a team sport. *Breast J*, 10, 469–472. [PubMed: 15327510]

6. Hollunder S, Herrlinger U, Zipfel M, et al. (2018). Cross-sectional increase of adherence to multidisciplinary tumor board decisions. *BMC Canc*, 18, 936.
7. Taplin SH, Weaver S, Salas E, et al. (2015). Reviewing cancer care team effectiveness. *J Oncol Pract*, 11, 239–246. [PubMed: 25873056]
8. Lemieux-Charles L, & McGuire WL (2006). What do we know about health care team effectiveness? A review of the literature. *Med Care Res Rev*, 63, 263–300. [PubMed: 16651394]
9. Taylor C, Munro AJ, Glynne-Jones R, et al. (2010). Multidisciplinary team working in cancer: what is the evidence? *BMJ*, 340, c951. [PubMed: 20332315]
10. Farrugia DJ, Fischer TD, Delitto D, Spiguel LRP, & Shaw CM (2015). Improved breast cancer care quality metrics after implementation of a standardized tumor board documentation template. *J Oncol Pract*, 11, 421–423. [PubMed: 26384016]
11. Prakash S, Venkataraman S, Slanetz PJ, et al. (2016). Improving patient care by incorporation of multidisciplinary breast radiology-pathology correlation conference. *Can Assoc Radiol J*, 67, 122–129. [PubMed: 26632099]
12. Horvath LE, Yordan E, Malhotra D, et al. (2010). Multidisciplinary care in the oncology setting: historical perspective and data from lung and gynecology multidisciplinary clinics. *J Oncol Pract*, 6, e21–e26. [PubMed: 21358946]
13. Friedman EL, Kruklytis RJ, Patson BJ, Sopka DM, & Weiss MJ (2016). Effectiveness of a thoracic multidisciplinary clinic in the treatment of stage III non-small-cell lung cancer. *J Multidisc Healthc*, 9, 267–274. [PubMed: 27358568]
14. Neal RD, Tharmanathan P, France B, et al. (2015). Is increased time to diagnosis and treatment in symptomatic cancer associated with poorer outcomes? Systematic review. *Br J Canc*, 112, S92eS107.
15. McCutcheon S, & Cardoso F (2015). Challenges in optimizing care in advanced breast cancer patients: results of an international survey linked to the ABC1 consensus conference. *Breast*, 24, 623–629. [PubMed: 26202888]
16. Wheeler SB, Reeder-Hayes KE, & Carey LA (2013). Disparities in breast cancer treatment and outcomes: biological, social, and health system determinants and opportunities for research. *Oncol*, 18, 986–993.
17. Bleicher RJ, Ruth K, Sigurdson ER, et al. (2016). Time to surgery and breast cancer survival in the United States. *JAMA Oncol*, 2, 330–339. [PubMed: 26659430]
18. Prades J, Remue E, van Hoof E, & Borrás JM (2015). Is it worth reorganising cancer services on the basis of multidisciplinary teams (MDTs)? A systematic review of the objectives and organisation of MDTs and their impact on patient outcomes. *Health Pol*, 119, 464–474.
19. Conca T, Saint-Pierre C, Herskovic V, et al. (2018). Multidisciplinary collaboration in the treatment of patients with type 2 diabetes in primary care: analysis using process mining. *J Med Internet Res*, 20, e127. [PubMed: 29636315]
20. Ginzburg T, Hoffman R, & Azuri J (2017). Improving diabetes control in the community: a nurse managed intervention model in a multidisciplinary clinic. *Aust J Adv Nurs*, 35, 23–30.
21. da Silva Sousa AM, Fiuza D, Mikami FCF, Abrão KC, Francisco RPV, & Zugaib M (2016). Evaluation of information retention and adherence to treatment in patients with gestational diabetes mellitus after multidisciplinary group. *Rev Assoc Med Bras*, 62, 212–217. [PubMed: 27310543]

Table 1.

Patient demographics and characteristics.

	All Study Patients
Age, years (mean \pm SD)	61.7 \pm 13.3
Number of live births (mean \pm SD)	2.2 \pm 1.6
Insurance	Public 183 (34.0%) Private 356 (66.0%)
Family history of cancer	No 282 (52.3%) Yes 257 (47.7%)
Group (n = 541)	Non-cMDC 122 (22.6%) cMDC 419 (77.4%)
Race (n = 512)	White 280 (54.6%) Black 232 (42.9%)
Diagnosis to initial treatment (n = 526)	30 days 270 (51.3%) 31–60 days 218 (41.4%) >60 days 38 (7.2%)
Diagnosis to initial treatment (n = 526)	30 days 270 (51.3%) >30 days 256 (48.7%)
Diagnosis to initial treatment (n = 526)	60 days 488 (92.8%) >60 days 38 (7.2%)
Diagnosis to initial treatment, days (mean \pm SD)	35.1 \pm 31.4
Median	30.0
Number of missed/cancelled appointments (mean \pm SD)	3.6 \pm 5.5
Median	2.0

SD, standard deviation; cMDC, comprehensive multidisciplinary care.

Race status is known for 540 of 541 patients; 27 patients not included in analyses self-reported as Asian (18), Hispanic (6), Middle Eastern (1), and “other” (2). Days from diagnosis to initial treatment known for 526 patients; the other 16 did not pursue that form of treatment following diagnosis.

Table 2.

Non-cMDC group race comparisons.

	Race		<i>p</i> -value
	Whites	Blacks	
Diagnosis to initial treatment	30 days	28 (50.0%)	0.034 (F) ^a
	31–60 days	20 (35.7%)	
	>60 days	8 (14.3%)	
	n = 58	n = 56	
Diagnosis to initial treatment	30 days	28 (50.0%)	0.137 (C)
	>30 days	28 (50.0%)	
		n = 58	
Diagnosis to initial treatment	60 da ys	48 (85.7%)	0.016 (F) ^a
	>60 da ys	8 (14.3%)	
		n = 58	
Diagnosis to initial treatment, days (mean ± SD)	28.2 ± 14.8	46.9 ± 64.6	0.024 (W) ^a
Median	26.5	31.5	
Missed/cancelled appointments (mean ± SD)	4.2 ± 5.5	5.4 ± 9.1	0.993 (W)
Median	2.5	2.0	

C, chi-square test; F, Fisher's exact test; SD, standard deviation; W, Wilcoxon rank sum test.

² Black patients did not pursue treatment

^a Statistically significant, *p* < 0.05.

Table 3.

cMDC group race comparisons.

		Race		
		Whites	Blacks	p-value
Diagnosis to initial treatment	30 days	114 (53.5%)	71 (41.8%)	0.044 ^a
	31–60 days	87 (40.8%)	82 (48.2%)	
	>60 days	12 (5.6%)	17 (10.0%)	
		n = 213	n = 170	
Diagnosis to initial treatment	30 days	114 (53.5%)	71 (41.8%)	0.022 (C) ^a
	>30 days	99 (46.5%)	99 (58.2%)	
		n = 213	n = 170	
Diagnosis to initial treatment	60 days	201 (94.4%)	153 (90.0%)	0.109 (C)
	>60 days	12 (.6%)	17 (10.0%)	
		n = 213	n = 170	
Diagnosis to initial treatment, days (mean ± SD)		31.4 ± 16.3	39.9 ± 34.1	0.001 (W) ^a
Median		30.0	33.0	
Missed/cancelled appointments (mean ± SD)		2.7 ± 4.8	3.9 ± 4.6	<0.001 (W) ^a
Median		2.0	2.5	

C, chi-square test; cMDC, comprehensive multidisciplinary care; SD, standard deviation; W, Wilcoxon rank sum test.

^aStatistically significant, p < 0.05.

Non-cMDC versus cMDC group comparisons for whites only.

Table 4.

		White Non-cMDC	White cMDC	<i>p</i> -value
Diagnosis to initial treatment	30 days	37 (63.8%)	114 (53.5%)	0.249 (C)
	31–60 days	20 (34.5%)	87 (40.8%)	
	>60 days	1 (1.7%)	12 (5.6%)	
		n = 58	n = 213	
Diagnosis to initial treatment	30 days	37 (63.8%)	114 (53.5%)	0.163 (C)
	>30 days	21 (36.2%)	99 (46.5%)	
		n = 58	n = 213	
Diagnosis to initial treatment	60 days	57 (98.3%)	201 (94.4%)	0.311 (F)
	>60 days	1 (1.7%)	12 (5.6%)	
		n = 58	n = 213	
Diagnosis to initial treatment, days (mean ± SD)		28.2 ± 14.8	31.4 ± 16.3	0.129 (W)
Median		26.5	30.0	
Missed/cancelled appointments (mean ± SD)		4.2 ± 5.5	2.7 ± 4.8	0.010 (W) ^a
Median		2.5	2.0	

C, chi-square test; F, Fisher's exact test; cMDC, comprehensive multidisciplinary care; SD, standard deviation; W, Wilcoxon rank sum test.

^aStatistically significant, *p* < 0.05.

Table 5.

Non-cMDC versus cMDC group comparisons for blacks only.

		Black Non-cMDC	Black cMDC	p-value
Diagnosis to initial treatment	30 days	28 (50.0%)	71 (41.8%)	0.245 (C)
	31–60 days	20 (35.7%)	82 (48.2%)	
	>60 days	8 (14.3%)	17 (10.0%)	
		n = 56	n = 170	
Diagnosis to initial treatment	30 days	28 (50.0%)	71 (41.8%)	0.281 (C)
	>30 days	28 (50.0%)	99 (58.2%)	
		n = 56	n = 170	
Diagnosis to initial treatment	60 days	48 (85.7%)	153 (90.0%)	0.375 (C)
	>60 days	8 (14.3%)	17 (10.0%)	
		n = 56	n = 170	
Diagnosis to initial treatment, days (mean ± SD)		46.9 ± 64.6	39.9 ± 34.1	0.602 (W)
Median		31.5	33.0	
Missed/cancelled appointments (mean ± SD)		5.4 ± 9.1	3.9 ± 4.6	0.918 (W)
Median		2.0	2.5	

C, chi-square test; cMDC, comprehensive multidisciplinary care; SD, standard deviation; W, Wilcoxon rank sum test.

Table 6.

Group comparisons for all patients.

	Group			p-value
	Non-cMDC	cMDC		
Race				
White	58 (50.0%)	222 (56.1%)		0.249 (C)
Black	58 (50.0%)	174 (43.9%)		
	n = 110	n = 396		
Diagnosis to initial treatment				
30 days	69 (58.0%)	200 (49.3%)		0.198 (C)
31–60 days	41 (34.5%)	177 (43.6%)		
>60 days	9 (7.6%)	29 (7.1%)		
	n = 119	n = 406		
Diagnosis to initial treatment				
30 days	69 (58.0%)	200 (49.3%)		0.094 (C)
>30 days	50 (42.0%)	206 (50.7%)		
	n = 119	n = 406		
Diagnosis to initial treatment				
60 days	110 (92.4%)	377 (92.9%)		0.876 (C)
>60 days	9 (7.6%)	29 (7.1%)		
	n = 119	n = 406		
Diagnosis to initial treatment, days (mean ± SD)	36.7 ± 46.4	34.7 ± 25.6		0.130 (W)
Median	28.0	31.0		
Missed/cancelled appointments (mean ± SD)	4.9 ± 7.6	3.2 ± 4.6		0.029 (W) ^a
Median	2.0	2.0		

C, chi-square test; cMDC, comprehensive multidisciplinary care; SD, standard deviation; W, Wilcoxon rank sum test.

^aStatistically significant, p < 0.05.