Patient navigation: improving timeliness in the diagnosis of breast abnormalities

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Objective: Patient navigation is a process that provides assistance to referring physicians in arranging further investigations and consultation for defined patient groups. This can facilitate timely investigations and potentially minimize delays. The purpose of this study was to determine the impact of patient navigation on timeliness in the diagnosis of breast abnormalities. **Methods:** We retrospectively studied a cohort of 536 women who underwent breast core biopsy at our institution during comparable 6-month periods in 1999 and 2000 to determine the effects of patient navigation, age, and biopsy result on the wait for a biopsy after diagnostic imaging. Patient navigation was used for all women referred through the provincial breast cancer screening program. Navigation was unavailable to patients directly referred by physicians in 1999. In 2000, the program was expanded to encompass all patients. **Results:** From 1999 to 2000, the median wait for a biopsy remained relatively stable for "navigated" screening patients at 12 days (n = 97) and 13 days (n = 133), respectively. The introduction of patient navigation for directly referred patients resulted in a statistically significant decrease in waiting times, from 20 days (n = 144) in 1999 to 14 days (n = 162) in 2000. Age and biopsy results were statistically significant variables, but their effect on the group data was negligible relative to that of navigation. **Conclusions:** Patient navigation significantly improves timeliness in the diagnosis of breast abnormalities and can potentially improve quality of life with more timely reassurance for women with benign conditions and earlier treatment for those with malignancy.

Objectif : L'orientation des patients est un processus qui aide les médecins traitants à organiser d'autres examens et consultations pour des groupes précis de patients, ce qui peut accélérer les examens et réduire au minimum la durée des attentes. Cette étude visait à déterminer l'impact de l'orientation des patients sur la rapidité du diagnostic des anomalies du sein. **Méthodes :** Nous avons étudié rétrospectivement une cohorte de 536 femmes qui ont subi une microbiopsie du sein à notre établissement au cours de périodes comparables de six mois en 1999 et 2000 pour déterminer les effets que l'orientation des patientes, leur âge et le résultat de la biopsie ont sur l'attente d'une biopsie après une imagerie diagnostique. On utilisait l'orientation des patientes pour toutes les femmes référées par l'entremise du programme provincial de dépistage du cancer du sein. L'orientation n'était pas disponible pour les patientes référées directement par des médecins en 1999. En 2000, on a étendu le programme à toutes les patientes. **Résultats :** En 1999 et 2000, le délai médian d'attente pour une biopsie est demeuré relativement stable chez les patientes qui ont subi un dépistage et ont bénéficié de l'orientation, à 12 jours (n = 97) et 13 jours (n = 133) respectivement. La mise en œuvre de l'orientation des patientes référées directement a entraîné une diminution statistiquement significative des délais d'attente, qui sont tombés de 20 jours (n = 144) en 1999 à 14 jours (n = 162) en 2000. L'âge et les résultats de la biopsie ont constitué des variables statistiquement significatives, mais leur effet sur le groupe a été négligeable comparativement à celui de l'orientation. **Conclusions :** L'orientation des patientes améliore considérablement la rapidité du diagnostic des anomalies du sein et pourrait améliorer la qualité de vie des femmes en rassurant plus rapidement celles qui ont un problème bénin et en traitant plus rapidement celles qui ont une tumeur maligne.

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In 2004, breast cancer will be diagnosed in an estimated 21 400 women in Canada.[1] A significantly larger number of Canadian women will have abnormalities identified on screening examination or will require diagnostic imaging because of symptoms or findings on physical examination. The discovery of a breast abnormality results in significant anxiety for women and their families, with persistent psychologic effects both in women with cancer and in those with benign disease.[2–6] Diagnosis often requires several patient interactions with the health care system, each of which involves an associated waiting period. This often results in significant cumulative delays that contribute to the frustration and anxiety experienced by many patients.

After a patient has abnormal results on screening examination, further imaging investigations, a physical examination and consultation with the patient are usually undertaken to determine the diagnosis or need for a biopsy. Canadian provincial screening programs currently report the median time from abnormal results of a screening test to a diagnosis without a biopsy to be 3.7 weeks, with 10% of women waiting 9.6 weeks or longer. This increases to a median wait of 6.9 weeks, with 10% of women waiting at least 15.0 weeks, if a biopsy is required.[7] Concerns about the transition from screening to diagnostic testing expressed at a 1997 workshop on organized breast cancer screening in Ottawa resulted in the establishment of the Working Group on the Integration of Screening and Diagnosis.[8] This group studied the course of events that follow the identification of abnormal screening test results in Canada and, in 1999, specific targets for timeliness were adopted.[9] Improving the timeliness of breast investigations should limit the anxiety and associated morbidity experienced by women with benign conditions, and this has the potential to decrease mortality for some women with cancer.[10–12]

Since its inception in 1990, the Nova Scotia Breast Screening Program has employed a "patient navigator" who has the responsibility of tracking patients and proactively facilitating further investigations following abnormal results on screening examination. In general, patients referred to our diagnostic imaging department (the Department of Diagnostic Imaging, Queen Elizabeth II Health Sciences Centre, Halifax, NS) from the Nova Scotia Breast Screening Program seemed to obtain a diagnosis more quickly than patients directly referred by their physicians. It was felt that navigation might be a contributing factor and, in the year 2000, the patient navigator project was expanded to include all women with imaging findings that required further testing. This presented us with a unique opportunity to study the factors that influence timeliness, with the hypothesis that patient navigation can significantly reduce waiting times related to the evaluation of breast abnormalities.

PATIENT NAVIGATION

Patient navigation refers to a process whereby designated individuals proactively guide patients through the bureaucracy of the health care system to facilitate the successful completion of a specific diagnostic or therapeutic task. The term "patient navigation" first appeared in the medical literature in 1995, describing a means of improving access to tests and follow-up for medically underserved populations. Investigators reported that 85.7% of "navigated patients" had recommended breast biopsies compared with 56.6% of nonnavigated patients. Navigated patients also had their biopsies completed in a more timely fashion, with 71.4% of biopsies being completed before 4 weeks compared with 38.5% for nonnavigated patients.[13]

Our patient navigator serves primarily as a patient advocate, proactively facilitating and expediting the investigation of breast abnormalities in collaboration with primary care physicians. In most Canadian medical imaging centres, the confirmation of a breast lesion results in a written report being sent by fax or mailed to the referring physician. The patient is then notified of the findings, and the physician makes arrangements for the appropriate investigations or management. Each of the multiple steps in this process has an associated waiting period, which can result in significant cumulative delays. When a breast lesion requiring further imaging or tissue diagnosis is identified by a radiologist in our department, the patient navigator contacts the referring physician by telephone and communicates the findings and recommendations. Depending on the test results and the physician's preferences, the patient navigator can assist the referring physician by immediately booking the patient for the next available diagnostic imaging session or core needle biopsy appointment. Early communication allows the physician to achieve more timely patient notification and, if necessary, surgical consultation. Irrespective of the management plan, all cases are followed to ensure that investigations proceed in a timely fashion and that no patients are lost to follow-up. By these means, the navigator improves the efficiency of the process without interfering with the autonomy of the physician, or the patient, in management decisions.

The navigator has several responsibilities, most of which focus on minimizing patient anxiety and uncertainty during this difficult period. As a health care worker and breast cancer survivor, our patient navigator has a great depth of personal experience and knowledge regarding breast abnormalities, therapy and the diagnostic process. Upon the request of pa-

tients, or their physicians, the navigator will provide women with printed information about their diagnosis and meet with them to discuss the expected course of events and answer questions. In many cases, she provides emotional support to women during the process, which often continues after the completion of investigations. Detailed case monitoring by the navigator for quality assurance has also provided us with the opportunity to answer scientific questions. The effects of navigation on timeliness addressed in this article were identified and studied by these means.

The patient navigator project is supported financially by the Queen Elizabeth II Health Sciences Centre, the Nova Scotia Breast Screening Program and contributions from the community. Since its inception in 1990, the project has continued to evolve and expand, demonstrating other potential benefits to patients. Patient navigation shows promise in improving the efficiency of other steps in the diagnostic process and could easily be applied to other areas of medicine.

METHODS

Our cohort consisted of all 536 women who underwent a core needle biopsy procedure in our department's mammography section during the months of January through June, in 1999 and 2000. Patients were assigned to 1 of 4 groups based on the year of their biopsy and whether they had been initially referred for a diagnostic imaging examination through the provincial breast screening program or directly by their physician. In 1999, a total of 97 women were referred through the screening program, and 144 patients were directly referred. In 2000, a total of 133 women were referred through the screening program, whereas 162 patients were directly referred.

The interval between the diagnostic imaging examination and the core biopsy procedure was chosen to represent the measure of timeliness for each patient's investigations. An initial comparison of the median timeliness for each group revealed that there was a considerable difference between the screening and referral groups in 1999, which did not persist in the year 2000. To determine whether patient navigation was responsible for any or all of the observed differences, a biostatistician was consulted for a more rigorous evaluation of the data.

χ^2 analysis was performed, with navigation, patient age, biopsy result and the group to which a patient was assigned considered to be potentially important variables that might affect timeliness. Group assignment was treated as a separate covariate variable in order to determine whether any uncontrolled variable(s) might have significantly influenced our results.

Univariate techniques were employed to determine whether any of the specified variables were significantly correlated with timeliness, and covariate techniques were used to determine the independent effect of each variable on timeliness.

The Wilcoxon test, as described by Kalbfleisch and Prentice,[14] and log-rank tests were used to determine the significance of each variable. A p value of < 0.05 was chosen as the threshold to accept the alternative hypothesis that a variable had a significant influence on timeliness.

A subjective, but more conceptually practical, comparison of timeliness between groups was also performed using waiting-time curves. These were obtained by plotting the percentage of women within a group still waiting to have a biopsy as a function of time. The number of days required to perform a biopsy on specific percentages of women in each group was then determined from these curves and compared.

RESULTS

Initial comparison of the 1999 groups reveals considerable differences in timeliness, with a median waiting period of 12 days for navigated screening patients and 20 days for nonnavigated referral patients. In 2000, the expansion of the patient navigator program to include referred patients resulted in a 30% improvement, with a median waiting period of 14 days. This is similar to the 13-day median waiting period experienced by screening patients in the same year (Table 1).

Univariate χ^2 analysis confirmed that the differences

Table 1: Group characteristics and preliminary comparison

Group	Navigation	No. of patients	Mean age (and range), yr	Benign results, %*	Median wait for biopsy, d
1999					
Screening	Yes	97	53 (40–75)	80	12
Referral	No	144	52 (19–92)	50	20
2000					
Screening	Yes	133	54 (40–75)	83	13
Referral	Yes	162	55 (22–93)	63	14

*Percentage of biopsies that did not show evidence of invasive malignancy or carcinoma in situ.

in timeliness based on patient navigation and group assignment are statistically significant ($p < 0.001$) using both the Wilcoxon and log-rank tests (Table 2). Because of the method of group selection, there is considerable overlap between the variables of navigation and group assignment. The true influence of each variable on timeliness should therefore be inferred from the covariate analysis, in which patient navigation retains a high level of significance and group assignment shows no residual correlation (Table 2).

Patient age ranges and biopsy results differed between screening and referral populations (Table 1), necessitating the use of covariate techniques to minimize potential bias related to group selection. Both of these variables were subsequently proven to have statistically significant relations with timeliness (Table 2). The influence of these variables on the group data was very small compared with that of navigation, as evidenced by the lack of correlation demonstrated using univariate analysis. All results were similar using either the Wilcoxon or log-rank tests.

The magnitude of each effect, as it relates to the timeliness experienced by patients, can best be visualized using waiting-time curves. Fig. 1 and Fig. 2 demonstrate the similarities between navigated groups and the magnitude of the effects of navigation, respectively. In Fig. 2, the difference in timeliness is most pronounced for women who waited more than 10 days for the procedure and is large compared with differences related to patient age and biopsy result.

The times required to perform a biopsy on similar percentages of women within a group are summarized in Table 3. The differences in timeliness related to navigation are the greatest and are most marked for the 50% of patients with the greatest delays. It took more than twice as much time to perform a biopsy on 90% of the nonnavigated patients (53 d) compared with 90% of the navigated patients (23 d). Differences be-

Table 2: Correlation of variables with timeliness of breast biopsy

	χ^2 test, χ^2 statistic (and p value)			
Variable	Univariate Wilcoxon	Univariate log-rank	Covariate Wilcoxon	Covariate log-rank
Navigation	84.42 (< 0.001)	65.99 (< 0.001)	84.42 (< 0.001)	65.99 (< 0.001)
Biopsy result	0.73 (0.39)	0.39 (0.53)	93.23 (0.003)	73.88 (0.005)
Patient age	1.72 (0.19)	1.53 (0.22)	102.00 (0.003)	80.64 (0.009)
Group assignment	44.86 (< 0.001)	44.86 (< 0.001)	102.50 (0.50)	81.33 (0.41)

Note: Shaded regions indicate statistical significance with $p < 0.05$.

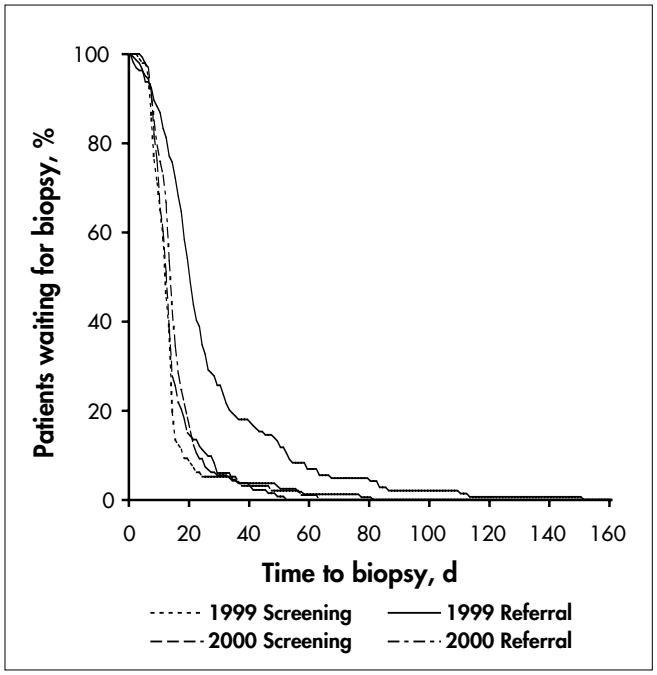

FIG. 1: Comparison of timeliness of biopsy after imaging examination for the study patients shows that after the implementation of patient navigation for referral patients in 2000, the waiting-time curve for that group was significantly shifted toward the left.

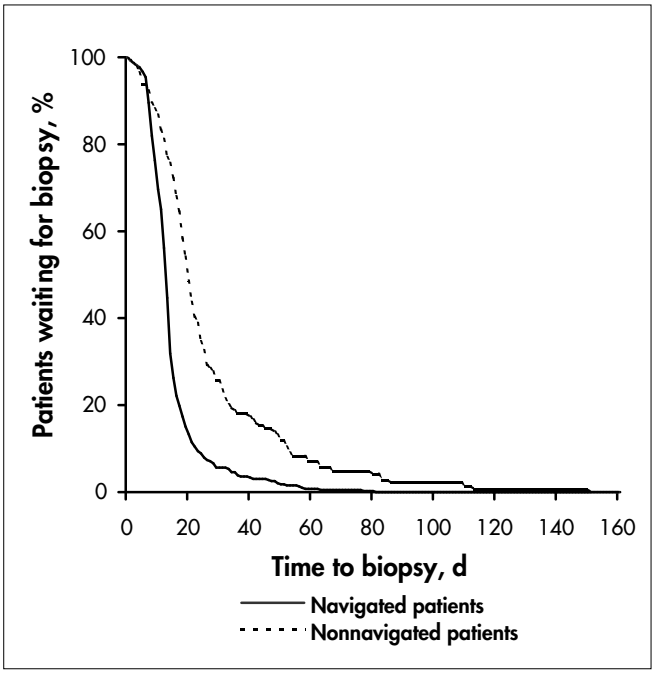

FIG. 2: Effect of navigation on timeliness of biopsy after imaging examination. Most navigated patients had their biopsy completed in a more timely fashion compared with nonnavigated patients.

Table 3: Timeliness comparisons derived from waiting-time curves

Group	No. of patients	Percentage of patients who underwent biopsy within specified time; no. of days			
		25%	50%	75%	90%
Navigated patients	392	10	13	16	23
Nonnavigated patients	144	15	20	31	53
Age < 40 yr	45	12	16	20	26
Age 40–75 yr	566	10	14	20	33
Age > 75 yr	25	13	16	21	41
Nonbenign result	174	9	13	20	29
Benign result	362	11	14	20	34

Note: Shaded regions represent subsets of women whose biopsies tended to be performed in the least timely fashion.

tween the groups were greatest for patients who waited more than 3 weeks for a biopsy. This was most evident for the 10% of nonnavigated patients who experienced the greatest delays. They waited more than twice as long for a biopsy compared with the most delayed 10% of navigated patients.

Of women who had their biopsy more than 3 weeks after the diagnostic imaging examination, younger women (< 40 yr) tended to receive their biopsies in a more timely fashion than older women (> 75 yr) (Table 3). The magnitude of this effect is small compared with the effect of navigation and the trend did not continue beyond 6 weeks, perhaps because of the small numbers of patients in the extreme age groups and the relation between age and cancer prevalence. Patients with a diagnosis of invasive cancer or carcinoma in situ, in general, had their biopsy performed more quickly than women with benign conditions. The improved timeliness likely reflects a suspicion bias,[12] with the acceleration of investigations for some women with a high suspicion of malignancy based on imaging and clinical grounds. These differences were also relatively small (Table 3) compared with differences seen between navigated and nonnavigated patients.

CONCLUSIONS

Our findings confirm that patient navigation improves timeliness in the diagnosis of breast abnormalities. The univariate χ^2 analysis and waiting-time curve comparisons show that navigation was the most important variable contributing to the improvement in timeliness observed for our year 2000 referral patients. Although some of the differences seen between the 1999 and 2000 referral groups may be attributed to the influence of other variables, these contributions were minimal. Both referral groups included younger and older women and had mean ages similar to those of the screening groups, negating any significant effect of age on the group results. The year 2000 referral group included a higher percentage of women with benign conditions, compared with the 1999 group (Table 1). If biopsy results significantly influenced our group findings, the effect would have been to decrease timeliness, in contrast to the observed improvement. The lack of a significant relation between timeliness and group assignment using covariate analysis suggests that there were no uncontrolled variables that should have systematically affected our results.

This experiment has only addressed 1 of the many steps in the diagnosis of a breast abnormality. Patient navigation has the potential to improve timeliness related to other stages of the process and also to improve the patient's experience in other ways, through education and peer support. As patient navigation continues to develop, its application to other areas of medicine such as screening for cervical, prostate or colorectal cancer can be realized.

Now that patient navigation has been proven to improve timeliness and compliance with follow-up,[13] further research will be necessary to determine the cost-effectiveness of patient navigation and its impact on morbidity and mortality. Future studies should continue to focus on improving timeliness, through the determination of barriers that cause delays and the identification of those patients most at risk of encountering them.

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