CANCER SYSTEM INDICATOR SNAPSHOTS

Geographic disparities in surgery for breast and rectal cancer in Canada

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INTRODUCTION

Equitable access to appropriate cancer treatment is fundamental for achieving universal, high-quality cancer care. One of the potential barriers to equitable access is the geographic location of the patient’s residence, particularly for patients living in rural and remote communities. Cancer surgery, using the examples of breast cancer and rectal cancer, might be particularly prone to equity differences given both the surgical and the nonsurgical complexities of treatment.

For women diagnosed with nonmetastatic breast cancer, guidelines generally recommend that breast-conserving therapy be offered as an alternative to mastectomy. Breast-conserving therapy is less invasive and is associated with better cosmetic and psychological outcomes; it is also associated with survival at least comparable to that with mastectomy. However, breast-conserving therapy requires multiple visits to a cancer clinic for radiation therapy after surgery, which, for many patients in rural and remote communities, requires long travel times, extended time off work, and significant indirect patient costs.

For rectal cancer, colostomy has been shown to impair patient quality of life, although patients receiving anal sphincter–preserving operations can experience other symptoms adversely affecting quality of life. The percentage of rectal resections requiring a permanent colostomy has been linked to hospital volume. Patients undergoing surgery at high-volume hospitals are less likely to have permanent colostomies and experience better survival than those treated in low-volume hospitals.

Although many factors, including informed patient choice, influence treatment decisions, geographic location is an important and potentially mutable factor that might affect treatment patterns. This article reports a contemporary analysis examining the impact of geographic location on two cancer surgery procedures: mastectomy and permanent colostomy in rectal resections.

METHODS

Data for this analysis came from the Canadian Institute for Health Information. Specifically, data for mastectomy were obtained from the Hospital Morbidity Database, the National Ambulatory Care Reporting System and Alberta Ambulatory Care Reporting System, Alberta Health and Wellness, for fiscal years 2007–2008 to 2011–2012. For Alberta, the data years examined were 2006–2007 to 2010–2011 because of limitations in the availability of day-surgery data. Data for colostomy rates came from the Hospital Morbidity Database for fiscal years 2007–2008 to 2011–2012.

The mastectomy rate was defined as the percentage of breast cancer resections that were mastectomies among women diagnosed with unilateral invasive breast cancer. Those procedures included mastectomies performed as the initial therapeutic procedure and also procedures in women who underwent an initial attempt at breast-conserving surgery that was followed by mastectomy within 1 year. The permanent colostomy rate was defined as the percentage of individuals with a diagnosis of rectal cancer who underwent a rectal resection with a permanent colostomy or ileostomy. More details about the methodology, including the Canadian Classification of Health Interventions procedure codes used to define the surgeries are available online at http://www.cancerview.ca/systemperformancereport.

Geography was defined as the patient’s place of residence at the time of admission for surgery. Geographic location of the patient (urban, rural, remote) was determined by using Statistics Canada’s Postal Code Conversion File (PCCF+) to link the patient’s postal code with a geographic area. Geographic location was adapted based on Statistics Canada’s
census metropolitan area and census agglomeration influenced zones\textsuperscript{7}, which take into account population size, distance, and commuting flow between rural areas and small towns and larger centres\textsuperscript{8}.

To assess the effect of distance, patients and cancer centres or treating hospitals were mapped using postal codes, with latitude and longitude derived from PCCF\textsuperscript{+}. The proximity analysis was performed by the Canadian Institute for Health Information using the “closest facility” feature of the ArcGIS 10 software (ESRI, Redlands, CA, U.S.A.). For the mastectomy data, one-way travel time from the patient’s place of residence to the closest hospital per forming at least 5 rectal resections over the 5-year period. Quebec was excluded from the travel time analyses because of data limitations.

RESULTS

Mastectomy Rates

During the timeframe examined, 58,324 women diagnosed with unilateral invasive breast cancer underwent surgery, with 22,867 (39.2\%) receiving a mastectomy. When examined by geography, a mastectomy was received by 52\% of women residing in very remote parts of the country and by 38\% of women living in urban and non-remote rural areas (Figure 1). Similarly, increasing distance of residence from the nearest radiation treatment facility was associated with an increasing rate of mastectomy: 56\% of women living farther than 180 minutes’ drive time from a radiation treatment facility underwent a mastectomy; 40\% of women residing less than 40 minutes from a radiation treatment facility were given the procedure (Figure 1).

Colostomy Rates

From 2007–2008 to 2011–2012, 10,559 individuals were diagnosed with rectal cancer and underwent a rectal resection. Of those individuals, 3895 received a permanent colostomy or ileostomy for an overall colostomy rate of 36.9\%. When examined by geography,

\textsuperscript{a} Geographic categories were grouped as follows: urban = census metropolitan areas (CMAs) and census agglomerations (CAs) with a core population of 10,000 or more, and 50\% or more of the population commutes to a CA or MA; rural = population of less than 10,000 and 30\%–49\% of the population commutes to an urban area; rural–remote = population of less than 10,000 and 5%–29\% of the population commutes to an urban area; rural–very remote = population of less than 10,000 and 0\%–5\% of the population commutes to an urban area (includes non-urban parts of the territories).

\textsuperscript{7} Influenced zones.\textsuperscript{8} Urban areas and small towns and large centres.

FIGURE 1 Percentage of breast cancer resections that were mastectomies, by geography and travel time in minutes to the nearest radiation treatment facility, Canada, 2007–2008 to 2011–2012 combined. The mastectomy rate includes women who received a mastectomy as initial treatment and women who received a breast-conserving surgery first, followed by mastectomy within 1 year. The Province of Quebec is excluded from the travel time analysis. Data sources: Hospital Morbidity Database, Canadian Institute for Health Information; National Ambulatory Care Reporting System, Canadian Institute for Health Information; Fichier des hospitalisations MED-ÉCHO, ministère de la Santé et des Services sociaux du Québec; Alberta Ambulatory Care Reporting System.

Canadians living in remote parts of the country were more likely than urban Canadians to receive a rectal resection requiring a permanent colostomy (Figure 2). Likewise, permanent colostomy rates increased modestly as travel time to a hospital performing such procedures increased. The colostomy rate by distance exceeded 40\% for patients with a travel time of 40 minutes or longer and was 36\% for patients living within 40 minutes of a specialized hospital.

DISCUSSION

The data show variations in cancer treatment by geographic location and highlight potential barriers to care. The higher mastectomy rate in rural and remote areas might reflect limited or difficult access to radiation therapy, typically required with breast-conserving surgery. In addition, the modest increase in colostomy rates among Canadians living in more remote areas might reflect systematic differences in care and decision-making with those patients. Some limitations should be noted. First, in addition to geographic location, other factors such as patient socioeconomic status, education level, and income, and physician characteristics such as specialty training and procedure volumes also play a role and might influence treatment recommendations and choices. In addition, given that the data used were not linked to any cancer registry, the analyses could not control for potential differences in disease characteristics such as stage.
SUMMARY

Overall, the results demonstrate that geographic location poses a potential challenge to access, although it is only one facet of access to care. Our findings suggest that there are opportunities to better understand and potentially to improve care for Canadians residing in areas remote from cancer treatment facilities. More information about this report can be found at http://www.cancerview.ca/systemperformancereport. Downloadable slides of the figures in this communication can be downloaded at http://www.cancerview.ca/downloadableslides.

CONFLICT OF INTEREST DISCLOSURES

The authors have no financial conflicts of interest to declare.

REFERENCES


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