

Day Surgery: Trends for Breast Cancer Surgery and Readmissions in Canada, 1986–1999

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Abstract

Background: The extent to which breast conserving surgeries (BCS) and mastectomies are conducted in day surgery in Canada is unknown. This study explored temporal and age-related trends in the performance of breast cancer surgeries as day procedures. Hospital readmissions for day surgeries and in-patient surgeries were compared. **Methods:** Breast cancer separations between 1986 and 1999 treated by mastectomy or BCS were identified in the Discharge Abstract Database. Proportions of surgeries performed annually in day surgery were estimated nationally, provincially, and by age-strata. Thirty-day readmission rates, including the reasons for readmission, were compared for in-patient and day procedures.

Results: Day surgery use increased from 8.7% to 41.0% between 1986 and 1999. Most of this increase was due to BCS (57% were done in day

surgery in 1999). BCS conducted in day surgery was more common in women 40 to 69 years old in the 1980s; variation by age disappeared by 1996. Few mastectomies were done in day surgery (5.9% in 1999) and rates varied little by age strata. In 1986, 60% of day surgeries resulted in readmission and 44% in 1999. The most common readmission reasons for day surgery procedures were completion mastectomies, further BCS, or lymph node excision.

Interpretation: Day surgery use for breast cancer surgery, particularly for BCS, has increased dramatically. As of the late 1990s, rates of BCS performed in day surgery no longer vary by age. Day surgery readmission rates were higher than for in-patient surgery and follow-up surgeries were the main readmission reasons.

Keywords: Breast cancer, breast conservation, mastectomy, day surgery.

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Introduction

A worldwide shift has occurred towards progressively earlier patient discharge from hospital after surgery. In many countries, day surgery, where patients are sent home the same day as the surgery, is now the predominant venue for surgical procedures [1,2]. In Canada, an estimated 70% of surgeries were done in day surgery in 1995/96 [3].

Among Canadian women, declining length of hospital stay (LOS) has been reported over the last two decades for breast conserving surgery (BCS) and mastectomy from a mean of 8 to 2 days and from 11 to 3 days, respectively [4]. Empirical evidence indicates that early discharge is not, in general, associated with excess surgical complications, including axillary seroma formation [5–9], wound infection [5,6,9,10], swelling of the arm or hand [9,11], drain site infections [12], or restricted shoulder movement [9]. Moreover, early discharge actually appears to confer physical and psychological advantages to patients, including better emotional adjustment [13,14], earlier regaining of independence [16], and earlier return to work [6,14,15] or to other normal activities [14].

Exploring this shift is important as limited data exist regarding the extent to which breast cancer surgery is performed in day surgery in Canada. Also, almost 22,000 Canadian women are diagnosed with breast cancer annually, making it the most common non-skin cancer amongst women [17]. Most of these women will require surgical intervention [16]. As the population ages, the demand for surgery will inevitably increase since about half of breast cancer cases are in women 60 years of age or older [17]. Early hospital discharge is a

comparatively safe practice but little is known about the consequences of these procedures specifically when performed in day surgery. The objectives of this study were to explore the provincial, age-related, and temporal trends of breast cancer surgery conducted as day surgery in Canada and to compare the readmission profiles for breast cancer surgeries conducted in day surgery or in-patient settings.

Methods

Separations in the Discharge Abstract Database (DAD) with a primary diagnosis of female breast cancer between 1986/87 and 1999/2000 were identified using the International Classification of Diseases, Ninth Revision (174.0 to 174.9). The DAD is a repository of hospital in-patient and day surgery events in all Canadian provinces and territories, except for Quebec and part of Manitoba. Cases treated by mastectomy (97.12 to 97.19) or BCS (97.11, 97.27 to 97.28) were selected using the Canadian Classification of Diagnostic and Therapeutic Procedure codes.

The fiscal year extends from April 1 of a given year to March 31 of the following year. For convenience the fiscal year will be referred to as single years, for example fiscal year 1986/1987 will be referred to as 1986 and fiscal year 1987/1988 as 1987, etc..

The proportion of BCS and mastectomies done as day surgery between fiscal years 1986 and 1999 were calculated by province and by 10-year age strata. This analysis was limited to British Columbia, Saskatchewan, Ontario, Prince Edward Island, and Newfoundland

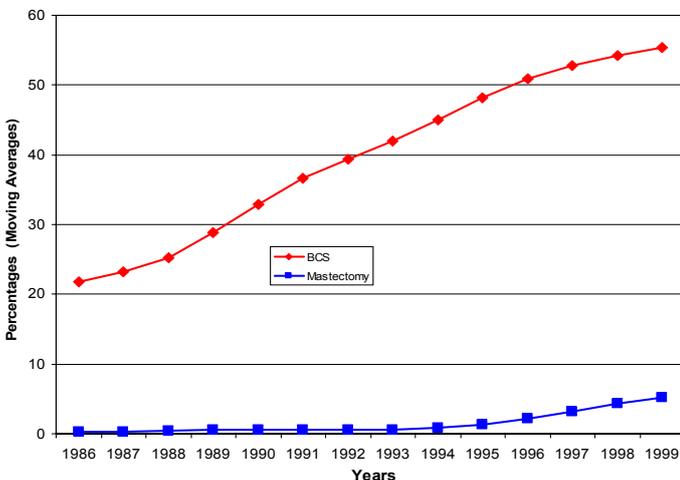
since day surgery information was unavailable for other provinces before 1990. The relatively few cases for women under 40 years of age were excluded from the analysis. As the data were event-oriented, it is possible for an individual woman to be counted multiple times if she is admitted more than once in a year. Three-year moving averages were used to depict general trends.

Data from the DAD were used to calculate the 30-day readmission rates for 1993 and 1999 and to determine the reasons for readmission by original venue stratified by surgical type. Data for these two fiscal years were available for the above five provinces plus Nova Scotia and New Brunswick.

Results

Between 1986 and 1999, the proportion of breast cancer surgeries conducted in day surgery rose almost five-fold from 8.7% to 41.0%. This growth was mainly attributable to an increasing use of day surgery for BCS. In 1986, day surgery was the venue for 21.1% of BCS, increasing to 56.8% in 1999 (Figure 1).

Figure 1 Proportion of Breast Conserving Surgeries and Mastectomies by Day Surgery in Canada.



In 1986, considerable variation in day surgery use occurred provincially, with less than 10% of BCS performed as day surgery in Saskatchewan and Newfoundland, ranging up to 40% in British Columbia (Figure 2a). Over the subsequent decade, rates of day surgery for BCS increased in all provinces except B.C. This upward trend slowed in the mid 1990s and by the end of the observation period, the proportion of BCS performed as day surgery ranged from 40% to just over 60%. Until the mid 1990s, the use of day surgery for BCS was more common for women age 40 to 69 years than for those age 70 years and older (Figure 2b). The age difference was largely eliminated by the late 1990s.

By contrast, the proportion of mastectomies performed in day surgery was much lower, reaching a high of 5.9% in 1999 (Figure 1). Provincial rates remained essentially constant at less than 1% throughout the entire period, except for Ontario where day surgery was the venue for almost 8.0% of mastectomies in 1999. The use of day surgery for mastectomy did not vary significantly between age groups over time (data not shown).

In 1993 and 1999, women were more likely to be readmitted when day surgery was the venue for the original surgical procedure compared with in-patient surgery (Table 1). However, between 1993 and 1999 the 30-day readmission rate for day surgery procedures had declined from 59.5% to 44.3%. The majority of the decline could be attributed to a marked improvement over time in readmission rates for mastectomy-day surgery patients.

Figure 2a Proportion of BCS Performed in Day Surgery by Province.

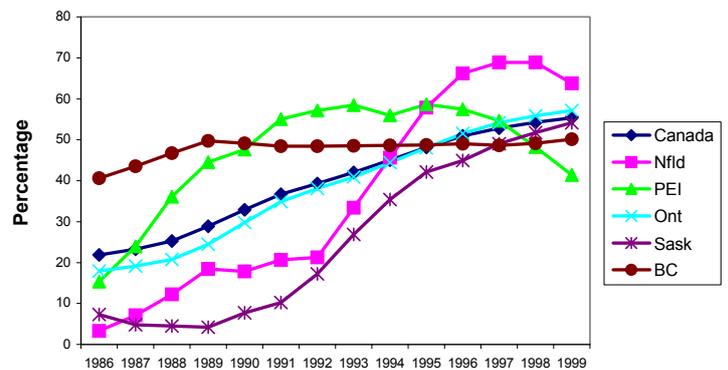


Figure 2b Proportion of BCS Performed in Day Surgery by Age Strata.

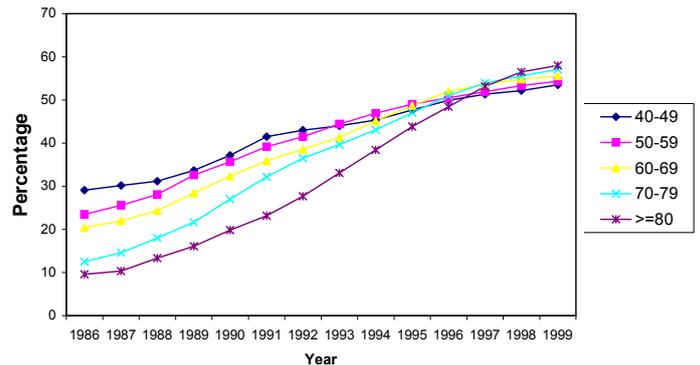


Table 1 Breast surgery readmissions within 30 days after the first readmission.*

Year	Venue of First Admission	Number of Surgical Procedures	Number of Subjects readmitted, N(%)
1993	In-Patient	6105	647 (10.6)
	Day Surgery	2744	1632 (59.5)
1999	In-Patient	7084	736 (10.4)
	Day Surgery	4586	2030 (44.3)

* Limited to women 50 years and older

In 1993, about 60% of cases were readmitted following BCS performed in day surgery compared with 14.4% of cases who had in-patient-BCS (Table 2a). By 1999 the day surgery readmission rate had declined to 45.5% with little change in the in-patient rate. Of the few mastectomies performed in day surgery in 1993, 41.7% resulted in hospital readmission compared to 6.4% for mastectomies performed in in-patient care (Table 2b). In both time periods women who underwent day surgery procedures, either BCS or mastectomies, had a greater probability of readmission for either a completion mastectomy, further conserving surgery, or a lymph node excision compared to women having in-patient surgery.

Discussion

Temporal Trends

All provinces experienced an upward trend in the use of day surgery for BCS. Several factors may be involved. BCS use increased temporally and superseded mastectomy as the most common surgical procedure to treat early stage breast cancer [18]. As surgeons became more familiar with BCS they may have also felt more

Table 2 Reasons for readmission from breast surgery within 30 days after the first admission.*†**a** Readmission after breast conserving surgery by venue of first admission in 1993 and 1999.

Reason for readmission	1993				1999			
	In-patient care (3198) [§]		Day surgery (2720)		In-patient care (3304)		Day surgery (4413)	
	N	%	N	%	N	%	N	%
Follow-up surgery [‡]	320	10,0	1536	56,5	315	9,5	1856	42,1
After surgery care	44	1,4	41	1,5	59	1,8	62	1,4
Post-operation infection	13	0,4	-	0,1	23	0,7	8	0,2
All others	85	2,7	42	1,5	67	2,0	82	1,9
Total	462	14,4	1622	59,6	464	14,0	2008	45,5

b Readmission after mastectomy by venue of first admission in 1993 and 1999.

Reason for readmission	1993				1999			
	In-patient care (2907)		Day surgery (24)		In-patient care (3780)		Day surgery (173)	
	N	%	N	%	N	%	N	%
Follow-up surgery [‡]	17	0,6	6	25,0	22	0,6	7	4,0
After surgery care	61	2,1	-	16,7	95	2,5	9	5,2
Post-operation infection	19	0,7	-	0,0	40	1,1	-	1,2
All others	88	3,0	-	0,0	115	3,0	-	2,3
Total	185	6,4	10	41,7	272	7,3	22	12,7

*Limited to women 50 years and older †Cells with 5 or fewer events are indicated with a dash

[‡]Follow-up surgery refers to completion mastectomy, further breast conserving surgery, and lymph gland excision[§]Indicates the number of women undergoing surgery in a particular venue and year as indicated.

comfortable performing this less invasive procedure in day surgery. Additionally, acute care hospital beds have been closed as a means of cost-containment in the Canadian health care system [19], which contributed to declining LOS and eventually to discharge within 24 hours. Shortened LOS may afford substantial monetary savings [10,13,16,20]. It is projected that implementing home-based care for patients with early stage breast cancer would save \$20 million for BCS and \$13 million for mastectomies annually in Canada [20]. Finally, development of new anesthetic practices and anti-emetics that hasten post-operative recovery may have made early discharge more feasible [21-23], since post-operative pain [24,25], nausea [25], vomiting [25], and dizziness [25] are the most common causes of delayed discharge after day surgery.

Inter-provincial variations in the LOS following breast cancer surgery has been previously reported [4]. B.C. adopted the use of day surgery for BCS earlier than other provinces, which could be a sign of more drastic cost-cutting measures in that province.

Age Trends

By the late 1990s, women 70 years and older appeared to have essentially the same likelihood of undergoing BCS-day surgery as younger women. Several explanations for this trend are possible. The realization of the potential economic advantage of day surgery and the probable increased availability of home health care services [26], may have intensified the push towards same day hospital discharge [21]. As a result, selection criteria for day surgery may have become more inclusive and patients who in the past would not be considered suitable, for instance, sicker patients and elderly patients, may have been discharged from hospital sooner [26-28]. Further, elderly women, who are most likely to develop breast cancer, may also fear hospitals and prefer same day discharge [13]. Older women are also

less likely to undergo axillary lymph node dissection than younger women [29-33]. This component of both mastectomy and BCS is the one that causes the most discomfort, the need for drains, and the limited arm mobility that have traditionally kept women in hospital for several days after surgery.

Being of older age should not preclude women from day surgery [34,35]. Nonetheless, the observed increasing use of day surgery for older women is a potential concern because older breast cancer patients are more likely to have one or more co-morbidities [36-38] and to live alone. It has been suggested that both these characteristics may be relative contraindications for day surgery [10].

Readmissions

Women operated on in day surgery for breast cancer had a higher 30-day readmission rate, especially those who had BCS, compared to women operated on as in-patients. There is little published information about the readmission rates of women discharged early after breast cancer surgery. Previous studies, which did not have comparison groups, found that early discharge after breast cancer surgery had either no readmissions [7,16,34] or very low readmission rates [10]. These earlier studies were relatively small, the time intervals over which readmissions were monitored were not reported, and with one exception [7], the studies did not include women who had BCS. Only two studies, both conducted in the United States, involved day surgery procedures [16,34]. Hence, earlier studies may not be entirely applicable to the present analysis.

A relatively large proportion of women treated in day surgery was readmitted for follow-up surgery. However, these readmission rates must be interpreted with caution as they may not necessarily represent poor care but rather a normal course of treatment based

on findings from the initial surgery. For instance, re-admission for further surgery may be related to pathological findings of margin involvement or discovery of invasive disease when the pre-operative suspicion was in situ disease alone. Procedural coding errors may be another potential explanation for the high readmission rates found in this study. Specifically, some initial biopsies may be coded as BCS with the subsequent definitive BCS then mistakenly deemed a readmission.

Caveats

Early discharge may not be suitable for all women [11], for instance, women with grave comorbidities, psychiatric problems, and those without support at home [10]. Before a woman is discharged early, the availability of home support, including emotional support and access to community nurses should be considered [39]. Further, the patient and her family must be thoroughly informed before and after surgery [13,34]. Pre-surgery education alleviates patients' fears and enhances feelings of personal control [13]. Inclusion of family members in the education process promotes understanding of the disease and the surgery, improves acceptance of the surgery, increases families' feelings of usefulness, reduces familial anxiety, and enhances support for the patient [13,34].

Study Limitations

This study was retrospective and used data that, although collected prospectively, were not specifically collected for this study. Trends were estimated from available provincial data and may not completely represent the Canadian context. We were unable to examine patient-related correlates of day surgery use, besides age. Provincial variations in health services provision, such as the availability of home-based care and the availability of in-patient beds, were not considered. Reasons for readmission were relatively crudely categorized in some instances. Our data should not be used to estimate complication rates

since women may have been treated for complications not requiring hospitalization and would not have been captured by our data source.

Interpretation

This study demonstrates that day surgery is the predominant venue for BCS in Canada, that age does not appear to limit women undergoing BCS in day surgery and that day surgery readmission rates are relatively high, consisting mainly of follow-up surgeries. These findings lay the groundwork for the future examination of more in-depth issues as they relate to breast cancer day surgery in Canada.

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