Factors affecting surgical wait times for breast reconstruction

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OBJECTIVE: To examine factors that affect wait times for women seeking breast reconstruction at a Canadian academic centre.
METHODS: A retrospective audit of 57 women seeking breast reconstruction over a three-year period was completed. Comparisons of wait times were made considering the surgical pathology, timing of reconstruction (immediate versus delayed), urgency of pathology, method of reconstruction (implant versus autologous) and the number of surgeons involved. Specifically, the wait times from referral to specialist consultation, consultation to surgery, and referral to surgery were examined.
RESULTS: Women with active cancer (ductal carcinoma in situ: 43 days, invasive cancer: 40 days) had shorter wait times compared with those who had no active cancer (benign/high risk: 242 days, previously treated cancer: 343 days) (P<0.05). Women seeking delayed reconstruction had longer wait times (359 days) from referral to surgery than women seeking immediate reconstruction (98 days) (P<0.0001). Women seeking reconstruction at the time of mastectomy, with benign/high-risk disease, waited longer (242 days) than those with ductal carcinoma in situ (43 days) or invasive cancer (40 days) (P<0.001). Wait times for autologous free tissue transfer (213 days) were not significantly longer compared with implant reconstruction (116 days) (P=0.27). Women with acute cancer experienced similar wait times for implant reconstruction (44 days) as for a free tissue transfer (56 days) (P=0.46). Women with no acute cancer had similar wait times for implant (239 days) as free tissue transfer (369 days) (P=0.25). Patients requiring only plastic surgeons involved in the reconstructive effort waited longer (one surgeon: 299 days, two surgeons: 550 days) than patients requiring either two plastic surgeons and one general surgeon (130 days) or one plastic surgeon and one general surgeon (82 days) (P<0.05). Although more coordination is required with three surgeons, this is frequently associated with a diagnosis of acute cancer and, therefore, wait times are shorter.

Key Words: *Breast reconstruction; Wait times*

Les facteurs influant sur les temps d'attente avant de subir une reconstruction mammaire

OBJECTIF : Examiner les facteurs qui influent sur les temps d'attente chez les femmes devant subir une reconstruction mammaire dans un centre universitaire canadien.
MÉTHODOLOGIE : Sur une période de trois ans, les chercheurs ont effectué une étude rétrospective auprès de 57 femmes qui devaient subir une reconstruction mammaire. Ils ont comparé les temps d'attente compte tenu de la pathologie chirurgicale, du moment de la reconstruction (immédiat ou reporté), de l'urgence de la pathologie, de la méthode de reconstruction (implant ou autologue) et du nombre de chirurgiens exigés. Notamment, ils ont examiné le temps d'attente entre l'aiguillage vers une consultation auprès d'un spécialiste, la consultation et l'opération et l'aiguillage vers la chirurgie.
RÉSULTATS : Les femmes atteintes d'un cancer actif (carcinome canalaire *in situ* : 43 jours, cancer envahissant : 40 jours) attendaient moins longtemps que celles ayant un cancer non actif (bénin ou à haut risque : 242 jours, déjà traité : 343 jours) (P<0,05). Les femmes qui avaient besoin d'une reconstruction reportée attendaient plus longtemps (359 jours) entre l'aiguillage et l'opération que celles qui subissaient une reconstruction immédiate (98 jours) (P<0,0001). Les femmes qui avaient besoin d'une reconstruction au moment de la mastectomie et dont la maladie était bénigne ou à haut risque attendaient plus longtemps (242 jours) que celles ayant un carcinome canalaire *in situ* (43 jours) ou un cancer envahissant (40 jours) (P<0,001). Le temps d'attente avant un transfert de tissu libre autologue (213 jours) n'était pas considérablement plus long qu'avant la reconstruction par implant (116 jours) (P=0,27). Les femmes qui avaient un cancer aigu attendaient pendant une période similaire avant la reconstruction par implant (44 jours) qu'avant un transfert de tissu libre (56 jours) (P=0,46). Les femmes qui n'avaient pas un cancer aigu attendaient une période similaire pour recevoir un implant (239 jours) qu'un transfert de tissu libre (369 jours) (P=0,25). Les patientes qui n'avaient besoin que de plasticiens pour le travail de reconstruction attendaient plus longtemps (un chirurgien : 299 jours, deux chirurgiens : 550 jours) que celles qui avaient besoin soit de deux plasticiens et d'un chirurgien général (130 jours), soit d'un plasticien et d'un chirurgien général (82 jours) (P<0,05). Même s'il faut plus de coordination avec trois chirurgiens, cette situation s'associe souvent à un diagnostic de cancer aigu. Les temps d'attente sont donc plus courts.

In a setting of limited health care resources and financial cut backs, issues surrounding wait times for medical and surgical attention in Canada have been prominently featured in recent medical literature and in the media (1,2). Although intuitively a delay in treatment may be associated with an increased risk of metastases, studies examining the effect of delayed treatment on survival have been contradictory (3,4).

In Ontario, only 7.7% of women seek breast reconstruction following mastectomy (5). Although the reasons behind this are multifactorial, perceived delays in breast cancer treatment for women seeking reconstruction likely play a role. There is additional wait time incurred in referral to a plastic surgeon and in coordinating the operating room schedules of an oncologist and a reconstructive surgeon.

In the Australian public health care system, the factors affecting surgical wait times for patients seeking breast reconstruction were investigated by Sandelin et al (6). Patients seeking delayed reconstruction waited significantly longer than those seeking immediate reconstruction. Patients seeking autologous reconstruction waited significantly longer than

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TABLE 1
Patient characteristics (n=57)

	n
Timing of surgery	
Delayed	17
Immediate	40
Surgical pathology	
'High risk'/benign	10
Ductal carcinoma in situ	15
Invasive cancer	14
Previously treated cancer	18
Method of reconstruction	
Implants	19
Implants + latissimus dorsi flap	3
Latissimus dorsi flap only	1
Free transverse rectus abdominis myocutaneous flap	34
Unilateral versus bilateral	
Unilateral	23
Bilateral	34
Number of surgeons	
2 plastic surgeons, 1 general surgeon	18
1 plastic surgeons, 1 general surgeon	23
2 plastic surgeons	4
1 plastic surgeons	12

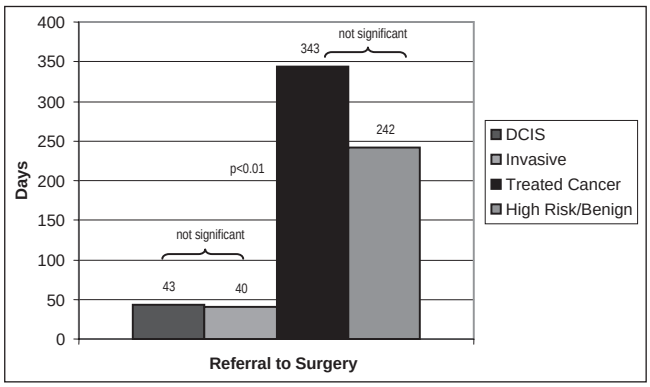

Figure 1) *Overall wait times (referral to surgery) stratified according to pathology. Patients with no current malignancy waited significantly longer (P<0.01) than patients with active cancer (ductal carcinoma in situ [DCIS] or invasive)*

those seeking implant reconstruction (6). The purpose of the present study was to quantify the length of wait times for women with breast cancer seeking reconstruction at St Joseph's Health Care Centre (London, Ontario).

METHODS

A retrospective audit of two surgeons' practices was conducted. Fifty-seven consecutive patients undergoing breast reconstruction between 2001 and 2004 were included in the study. Wait times were divided into three intervals: referral to consultation with the reconstructive surgeon, consultation to surgery, and the combined wait times (referral to surgery).

A number of factors were examined for their potential impact on wait times: surgical pathology (benign/high-risk breast disease – defined as *BRCA* mutation positive or a strong family history – versus breast cancer), timing of surgery (immediate versus delayed), urgency of pathology, method of

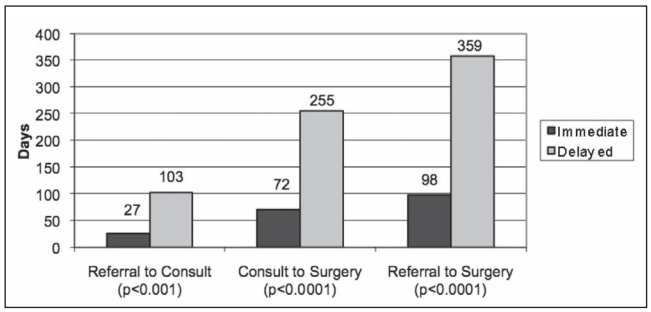

Figure 2) *Wait times for delayed versus immediate breast reconstruction. Patients seeking delayed reconstruction waited significantly longer (P<0.001) for all measured time intervals than those seeking immediate reconstruction*

reconstruction (implant versus autologous reconstruction), and one versus two or more surgeons required (Table 1).

Statistical analysis was performed using InStat 3 for Macintosh software version 3.0b (GraphPad Software Inc, USA). The distribution of wait time lengths did not follow a normal distribution and, hence, were compared with nonparametric tests: the Mann-Whitney test was used to compare two groups, while the Kruskal-Wallis test (nonparametric ANOVA) was used to compare more than two groups. P<0.05 was considered to be statistically significant.

RESULTS

Surgical pathology

There was no difference in wait time from referral to surgery between patients with benign/high-risk disease (242 days), and those with previously treated cancer (343 days) (P>0.05). There was no difference in wait time between patients with ductal carcinoma in situ (DCIS) (43 days) and invasive cancer pathology (40 days). Surgical pathology did influence wait times, however, because there was a decrease in wait times for those with active cancer (DCIS: 43 days, invasive cancer: 40 days) compared with those with no active cancer (benign/high risk: 242 days, previously treated cancer: 343 days) (P<0.05) (Figure 1).

Timing of reconstructive surgery

Wait times were significantly shorter for patients seeking immediate reconstruction than for those seeking delayed reconstruction (Figure 2). Immediate reconstruction was associated with approximately one-third of the wait time of patients seeking delayed reconstruction (98 days versus 359 days, respectively) (P<0.001) from referral to surgery.

Urgency of pathology and immediate reconstruction

Patients classified as benign/high risk waited longer (242 days) than patients with DCIS (43 days) or invasive cancer (40 days) when seeking immediate breast reconstruction (P<0.001) (Figure 3). Although the wait times associated with DCIS appeared longer than the wait times associated with invasive cancer, there was no statistical difference (P=0.35)

Method of reconstruction

Nineteen patients with implant reconstruction and 34 patients with free transverse rectus abdominis myocutaneous flap reconstruction were compared. Due to small sample numbers, patients undergoing latissimus dorsi reconstruction, with or without implants, were not included in the analysis of method

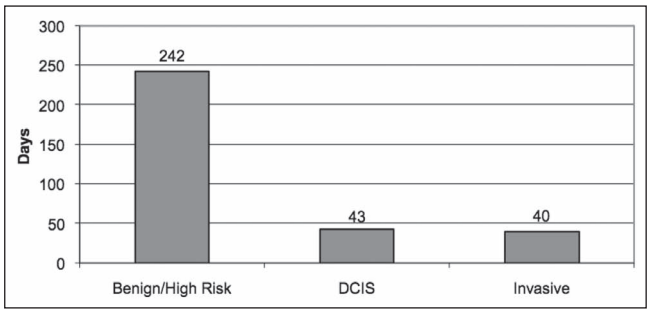

Figure 3) *Impact of pathology on wait times. In patients seeking immediate breast reconstruction, those with more urgent pathology (ductal carcinoma in situ [DCIS] or invasive) had significantly shorter wait times than patients who were benign/high risk*

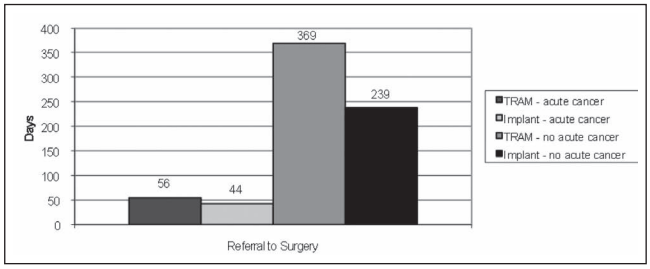

Figure 4) *Impact of pathology on wait times for various types of breast reconstruction. The type of reconstruction did not significantly affect wait times despite differences in operating time requirements between free flap and alloplastic reconstruction. TRAM Transverse rectus abdominis myocutaneous flap*

of reconstruction. Although wait times for patients seeking autologous free tissue transfer (213 days) were longer when compared with those seeking implant reconstruction (116 days), this difference was not significant (P=0.27).

Pathology and method of reconstruction

Women with acute cancer (DCIS or invasive) had similar wait times for implant reconstruction (44 days) as for free tissue transfer (56 days) (P=0.46). Women with no acute cancer (benign/high risk or previously treated) had similar wait times for implant reconstruction (239 days) as for free tissue transfer (369 days) (P=0.25). However, patients seeking either method of reconstruction had a significantly shorter wait time if they had active cancer (P<0.01) (Figure 4).

Number of surgeons

Some patients required two or three surgeons, depending on the timing and method of their reconstruction. Bilateral free flap, autologous tissue reconstruction was completed by a team of two plastic surgeons at St Joseph's Health Care Centre. A general surgeon was involved to perform the mastectomy for patients with acute cancer, or in the setting of a previously treated unilateral breast cancer with a planned contralateral prophylactic mastectomy and bilateral reconstructions. Patients not requiring a general surgeon waited significantly longer (299 days for a single plastic surgeon, and 550 days for two plastic surgeons) than patients requiring a general surgeon with either one or two plastic surgeons present (82 and 130 days respectively) (Figure 5). Although this may seem counterintuitive, this resulted from the fact that patients requiring a general surgeon to be present were generally those with acute cancers and, hence, were prioritized.

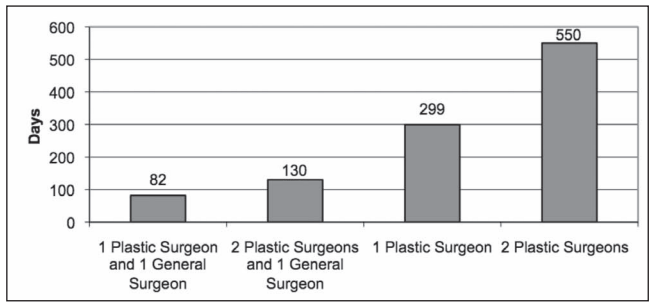

Figure 5) *Impact of the requirement for multiple surgeons on wait times*

DISCUSSION

Limited resources in the Canadian health care system have a direct impact on patient care (7,8), specifically on medical and surgical wait times for patients seeking breast reconstruction following cancer (5). In Ontario, only 7.7% of women undergoing mastectomy for breast cancer seek reconstruction (5). Part of this low number may be related to the anticipated delay in completing ablative, oncological surgery while waiting for plastic surgical consultation, and coordination of operating room time with general surgery. In a study within the British health care system, McManus et al (9) demonstrated that low rates of immediate breast reconstruction were associated with general surgeons' attitudes that reconstruction would delay adjuvant therapy. Other associated factors included geographical isolation (of the treating centre), general surgeons' concerns about the loss of patient management postreferral and a delay in obtaining plastic surgical consultation. Thus, timely consultation and planning for definitive treatment by the reconstructive breast surgeon is a significant factor in encouraging and facilitating reconstruction. In this group of women, the average wait time from surgery was 242 days for women with benign disease, 343 days for patients with previously treated disease, 43 days for women with DCIS and 40 days for patients with invasive cancer.

Wait times for surgery and complex imaging have been the subject of significant attention in Canada recently (10,11). The Fraser Institute in Canada is an independent organization that has been tracking wait times in Canada since 1988. Although their wait time survey has been criticized on methodological grounds, a recent report suggests that it is as reliable as data generated by government sources and may, in fact, underestimate true wait times (12,13). The Fraser Institute data from 2006 documented wait times from the time of plastic surgery consultation to surgical treatment that varied between a national low of 12.2 weeks in Ontario to a high of 56.4 weeks in Manitoba (12). The same report documented wait times for plastic surgery consultation after a family physician referral that varied between 24.2 weeks (Ontario) and 83.3 weeks (Nova Scotia) (12). It is likely that a referral from a general surgeon to a plastic surgeon would result in a shorter wait time for the initial plastic surgery consultation, but it is clear that wait times, particularly in the context of acute cancer or even DCIS, may be inappropriately long. Therefore, just as the concerns of British general surgeons that breast reconstruction may delay ablative surgery (9), similar concerns may be a significant factor in breast reconstruction – especially immediate reconstruction – not being offered to Canadian women.

In 1999, Britain instituted a two-week wait time target for family physician referral to specialist consultation for women with suspected breast cancer. As has occurred in Canada (14), hospital-specific wait times are posted on a government department of health website (15). Robinson et al (16) examined the overall effect of this 'guarantee', and found that while the proportion of women waiting longer than two weeks for consultation fell from 75.2% to 66.0%, the median time from consultation to treatment actually increased from 21.4 to 24.1 days. Therefore, overall time from referral to treatment 'changed little'. This study emphasizes the importance of defining just what 'wait times' encompass. In Canada, governments have typically chosen to focus on the time from decision to treat to treatment (17).

Simunovic et al (2) used the Canadian Institute for Health Information and the Ontario Health Insurance Plan databases to document a median surgical wait time increase of 36% for all major cancer surgery in Ontario between 1993 and 2000. The Fraser Institute data suggest that such increases in wait times were observed across all types of surgery during the same decade (18).

In 2002, Olson and de Gara (19) documented wait times from referral to surgical resection of 24 to 66 days in women with breast cancer. In the same province, Reed et al (1) demonstrated that wait times from definitive diagnosis and the initiation of treatment significantly increased from 1997 to 2000 (increase from 17.9 to 23.6 days). Olivotto et al (20) reviewed women with abnormal screening mammography from seven Canadian provinces and found that the time from abnormal screening to definitive diagnosis was 3.7 weeks, which increased to 6.9 weeks if biopsy was required. Thus, it can be seen that the true wait times that patients experience may be significantly different than those that are available to the public on government 'wait time' websites.

In the present article, we chose to examine the cumulative wait time from referral to surgery for women seeking breast reconstruction. We identified several patient factors that significantly affected wait times at St Joseph's Health Care Centre. These factors included surgical pathology – patients with an active cancer (DCIS or invasive) had significantly shorter wait times than patients with no active disease (benign/'high-risk' or previously treated) ($P<0.05$). Timing of reconstruction was another factor that influenced wait times – patients seeking delayed reconstruction waited significantly longer (359 days) than patients seeking immediate reconstruction (98 days) ($P<0.0001$). This is intuitive because the majority of patients seeking immediate reconstruction have acute cancer that requires definitive treatment, whereas women seeking delayed reconstruction have had their ablative cancer care completed, and can be scheduled electively. In patients seeking immediate breast reconstruction, the urgency of pathology was a contributing factor to the surgical wait time, with a longer wait for benign/high-risk pathology than for DCIS or invasive cancer ($P<0.001$). This difference in wait time persisted regardless of whether the patient sought implant or free tissue transfer reconstruction ($P<0.01$).

The influence of delay in treatment on survival has been examined by several authors. Richards et al (3) reviewed a group of women and found that a delay from the onset of symptoms to treatment of less than, or greater than, 12 weeks had a modest effect on survival (34% versus 24% at 20-year follow-up). However, when stratified according to tumour stage, a delay of greater than 12 weeks had no effect on survival. Sainsbury (4) reviewed a large group of more than 36,000 women with breast cancer and found that delays from referral by family physician to treatment of greater than 90 days had no impact on survival. They concluded that "the delays typically found in everyday practice do not have an impact on survival". Thus, while earlier treatment is intuitively associated with earlier stage disease and better survival rates, this may not be a valid conclusion. However, the psychological impact on women waiting for treatment was not measured in these survival-based outcomes. In particular, we are concerned that the long delays in the treatment of women seeking delayed reconstruction may negatively affect their full recovery from breast cancer diagnosis and treatment (21).

The number of surgeons involved in the case also impacts surgical wait times, although not as one might suspect. Women seeking immediate reconstruction require simultaneous scheduling of a general surgeon for the mastectomy and one or two plastic surgeons for the reconstruction. Although multiple surgical schedules need to be coordinated, wait times were significantly shorter than those requiring a plastic surgeon alone ($P<0.05$). This is because women requiring both general and plastic surgery have acute cancer, which requires more urgent treatment. It is reassuring that at St Joseph's Health Care Centre, despite limited operating room times and scheduling conflicts, surgeons are able to coordinate their schedules to prioritize patients requiring treatment for their breast cancer. Despite the effort to prioritize these patients, however, women with breast cancer are still waiting an average of 27 days (95% CI 17 to 26 days) from referral to initial consultation with a plastic surgeon, and 98 days (95% CI 61 to 136 days) from referral to surgery. It is our impression that these times have been successfully decreased since the study period, although no new resources have been allocated.

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