Journal of Plastic, Reconstructive & Aesthetic Surgery (2015) 68, 673–678

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

A single pre-operative antibiotic dose is as effective as continued antibiotic prophylaxis in implant-based breast reconstruction: A matched cohort study☆

William A. Townley [a,b], Narges Baluch [a,b], Shaghayegh Bagher [a,b], Saskia W.M.C. Maass [a,b], Anne O'Neill [a,b], Toni Zhong [a,b], Stefan O.P. Hofer [a,b,*]

[a] *Division of Plastic and Reconstructive Surgery, University Health Network, Toronto General Hospital, Toronto, Ontario, Canada*
[b] *Department of Surgery, University of Toronto, Toronto, Ontario, Canada*

Received 30 June 2014; accepted 19 December 2014

KEYWORDS
Implant-based breast reconstruction;
Breast cancer;
Infection rates;
Antibiotic prophylaxis;
Matched cohort study

Summary *Purpose:* Infections following implant-based breast reconstruction can lead to devastating consequences. There is currently no consensus on the need for post-operative antibiotics in preventing immediate infection. This study compared two different methods of infection prevention in this group of patients.
Method: A retrospective matched cohort study was performed on consecutive women undergoing implant-based breast reconstruction at University Health Network, Toronto (November 2008–December 2012). All patients received a single pre-operative intravenous antibiotic dose. Group A received minimal interventions and Group B underwent maximal prophylactic measures. Patient (age, smoking, diabetes, co-morbidities), oncologic and procedural variables (timing and laterality) were collected. Univariate and multivariate logistic regression were performed to compare outcomes between the two groups.
Results: Two hundred and eight patients underwent 647 implant procedures. After matching the two treatment groups by BMI, 94 patients in each treatment group yielding a total of 605 implant procedures were selected for analysis. The two groups were comparable in terms of patient and disease variables. Post-operative wound infection was similar in Group A ($n = 11$, 12%) compared with Group B ($n = 9$, 10%; $p = 0.8$). Univariate analysis revealed only pre-operative radiotherapy to be associated with the development of infection (0.004). Controlling for the effect of radiotherapy, multivariate analysis demonstrated that there was no

☆ **Previous presentations**: This study has been presented in part at the Canadian Plastic Surgery Meeting, Calgary, May 30, 2013.

* Corresponding author. Wharton Chair in Reconstructive Surgery, Chief Division of Plastic & Reconstructive Surgery, UHN, Toronto General Hospital, NU8-865, 200 Elizabeth St. Toronto, Ontario M5G 2C4, Canada. Tel.: +1 416 340 3449; fax: +1 416 340 4403.
E-mail address: Stefan.hofer@uhn.ca (S.O.P. Hofer).

http://dx.doi.org/10.1016/j.bjps.2014.12.041

statistically significant difference between the two methods for infection prevention.
Conclusions: Our findings suggest that a single pre-operative dose of intravenous antibiotics is equally as effective as continued antibiotic prophylaxis in preventing immediate infection in patients undergoing implant-based breast reconstructions.

Introduction

Infective complications following implant-based breast reconstruction range from 0 to 29% and can cause significant morbidity through prolonged inpatient stay, additional surgical procedures, delay in adjuvant therapy and the potential for compromised aesthetic outcome.[1] A variety of measures have been described to reduce infection including surgical glove change, limited pre-implant handling, implant soak and pocket irrigation with various antiseptic solutions. However, there is no consensus on the need for post-operative antibiotics in preventing infection. Data from breast augmentation surgery suggest that a single pre-operative intravenous dose of a cephalosporin is sufficient.[2] Similarly, in patients undergoing breast reconstruction, there is limited evidence to support the use of antibiotics after wound closure or while surgical drains are in place although a recent survey amongst plastic surgeons in North America suggests this is common practice.[3]

Recent published data provides conflicting information. A study by Clayton and colleagues found that surgical site infection increased dramatically (from 18% to 34%) when departmental policy changed from administering post-operative antibiotics to not doing so.[4] The change in policy had been initiated to comply with the Surgical Care Improvement Project. In contrast, a recent systematic review found no benefit in post-operative antibiotics beyond 24 h.[1] There is a cost to antibiotics use, both financial and in terms of possible morbidities (hypersensitivity reactions, drug resistance and related to prolonged antibiotic use — C. difficile infections). In light of the contradictory data and potential downside to antibiotics use, we set out to review our institutional data using statistically sound measures to help inform best practice.

The University Health Network is the largest tertiary referral center for breast cancer treatment in the province of Ontario that offers a full spectrum of breast reconstruction from autologous microsurgical, implant based, to a combination of implant with autologous tissue. Implant-based reconstruction is generally offered to women with low Body Mass Index (BMI), undergoing bilateral immediate reconstruction, with relatively small-to-moderate breast volumes, and do not wish for donor site morbidity elsewhere on their body.[5] Active smoking status and previous chest wall irradiation are relative contraindications for pure implant-based reconstructions on account of the increased risk of implant extrusion and primary wound healing complications.[6,7]

The current study was designed to determine the need for a pre-operative single dose vs. pre-operative single dose and continued post-operative prophylactic antibiotics in minimizing infective complications following implant-based breast reconstruction. The null hypothesis being that there is no difference between the two treatment regimes. The study design was facilitated by the fact that two contributing surgeons to this series utilize consistent and contrasting approaches to infection prevention. While one surgeon (Surgeon A) only employed a single pre-operative dosage of prophylactic antibiotics in all implant-based reconstructions, the other surgeon (Surgeon B) consistently utilized maximal precautions with both pre-operative intravenous and continued post-operative oral antibiotic prophylaxis until drain removal. In addition, Surgeon A employed saline pocket irrigation and saline skin reprepping as intra-operative precautions, whereas, Surgeon B consistently irrigated the implant pocket with antiseptic wash, and re-prepped the skin with Poviodine.

Materials and methods

A retrospective cohort study was performed of consecutive women undergoing implant-based breast reconstruction performed by two surgeons at University Health Network, Toronto (November 2008—December 2012). Patients were selected from a prospectively maintained breast reconstruction database. All patients received a single pre-operative intravenous antibiotic dose (1 g cefazoline or 600 mg clindamycin if penicillin-sensitive). Patients were divided into Group A and Group B according to which surgeon operated on them (SOPH vs. TZ). Group A received no additional postoperative measures to reduce infection. Saline pocket irrigation and skin cleaning prior to implant insertion were standard. No additional postoperative antibiotics were given. Group B received the following interventions to reduce infection: skin re-prepping with poviodine, pocket irrigation with bacitracin-saline solution and a course of post-operative oral antibiotics (Keflex 500 mg tid) until drain removal.

Six hundred and forty-eight breast implant procedures were performed in two hundred and eight patients undergoing breast reconstruction over the study period. Fifty-four percent of patients underwent treatment A (minimal infection prophylaxis); 351 implants in 114 patients and, 46% underwent treatment B (maximal prophylaxis); 297 implants in 94 patients. After matching the two treatment groups by BMI (± 2 kg/m ^{2}), 94 patients in each treatment group (Group A — 308 implant procedures, Group B — 297) were used for analysis.

The breast reconstruction database, clinic reports and operative notes were reviewed to obtain demographic and