



Are we closer to understanding the true morbidity following postmastectomy breast reconstruction?

Christodoulos Kaoutzanis, Neil Vranis, Nolan S. Karp

Hansjörg Wyss Department of Plastic Surgery, NYU Langone Health, New York, USA

Correspondence to: Christodoulos Kaoutzanis. 305 East 33rd Street, New York, NY 10016, USA. Email: ckaoutzanis@gmail.com.

Comment on: Bennett KG, Qi J, Kim HM, *et al.* Comparison of 2-Year Complication Rates Among Common Techniques for Postmastectomy Breast Reconstruction. *JAMA Surg* 2018;153:901-8.

Received: 29 October 2018; Accepted: 12 November 2018; Published: 14 November 2018.

doi: 10.21037/abs.2018.11.01

View this article at: <http://dx.doi.org/10.21037/abs.2018.11.01>

Breast cancer is one of the most common types of cancer in women, and mastectomy remains one of the definitive extirpative procedures for treatment. More recently, with advances in technology in gene sequencing, prophylactic mastectomies have become increasingly more common in the high-risk female population. This translates to an increased number of mastectomies performed annually. Breast reconstruction refinements and techniques have simultaneously advanced given the increased patient satisfaction and quality of life after a successful reconstruction (1-4). The choice of reconstruction varies, and is based on multiple factors related to both the patient and the involved surgeons. To date, previous studies of complications of the various reconstructive options have been limited by small patient populations at a single center with limited follow up.

The authors of this paper should be applauded for successfully executing a prospective, multi-center study, evaluating the complication profile of 2,343 patients following some of the most common reconstructive procedures, both implant-based and autologous tissue-based, with a robust 2-year follow up (5). The reconstructive procedures examined included direct-to-implant, expander-implant, latissimus dorsi flap, pedicled transverse rectus abdominis myocutaneous (pTRAM) flap, free transverse rectus abdominis myocutaneous (fTRAM) flap, deep inferior epigastric perforator (DIEP) flap, and superficial inferior epigastric artery (SIEA) flap. Some of the less commonly used autologous tissue-based reconstructive options were not included in the study due to the small number of patients.

The study confirms the current trends in breast reconstruction. Most of the reconstructions are implant-

based and as a result they are performed in an immediate fashion. Interestingly, the majority of autologous reconstructions were also performed in an immediate fashion for this study population. Given the higher rate of complications associated with immediate reconstructions, in addition to the increased risk of complications associated with radiation therapy, it would have been interesting if the authors included a sub-group analysis to determine if patients undergoing immediate autologous reconstructions with postoperative radiation therapy encountered significant complications within the 2-year follow up period. A previous study using the same database evaluated patient-reported outcomes with BREAST-Q questionnaire preoperatively and at 1 and 2 years postoperatively, and showed that immediate autologous breast reconstruction in the setting of postmastectomy radiation therapy appears to be a safe option that does not compromise breast aesthetics and quality of life (6). Another study from the same group comparing complications between patients with and without history of radiation who received reconstruction showed that autologous reconstruction was more commonly received by irradiated patients (37.9% *vs.* 25.0%, $P < 0.001$), and immediate reconstruction was less common in irradiated patients (83.0% *vs.* 95.7%, $P < 0.001$). At least one breast complication had occurred by two years in 38.9% of irradiated patients with implant reconstruction, 25.6% of irradiated patients with autologous reconstruction, 21.8% of non-irradiated patients with implant reconstruction, and 28.3% of non-irradiated patients with autologous reconstruction. In addition, among irradiated patients, autologous reconstruction was associated with a lower risk of complications than implant-based reconstruction

at two years (7). Although there is emerging evidence that autologous reconstruction can tolerate radiotherapy better than previously believed, the results are still somewhat variable and thought to be related to the radiotherapy techniques, dose or fractionation, and target volumes (8). All these factors can be different from institution to institution, which makes it difficult to generalize these conclusions. Certainly, further studies are needed to scrutinize this ongoing perplexing topic and more closely examine the long-term complications for this specific patient subgroup.

A thorough pre-operative discussion of individualized surgical risk sets the foundation and expectations for the reconstructive course between the physician and the patient. Such a discussion is based not only on patient characteristics, but also on the type of reconstruction. Notably, the overall complication rate in this cohort was 32.9%, including 19.3% of the patients requiring a reoperation and 9.8% developing a surgical site infection. Autologous reconstructions, regardless of flap donor site, had the highest complication rates, while direct-to-implant and expander-implant reconstructions had the higher failure rates, approximately 7%. Interestingly, reconstruction with a DIEP flap, which is perhaps the most popular type of autologous reconstruction performed nowadays, was associated with significantly lower odds of wound infection compared with expander-implant reconstruction. This finding is compatible with prior studies (9). This is an important point to discuss when counselling this patient population because, as pointed out by the authors, wound infection in an implant-based reconstruction often necessitates explantation, whereas an infection in an autologous reconstruction rarely requires debridement or flap excision. Unfortunately, the authors did not provide a more detailed breakdown of all the complications for implant-based and autologous reconstructions separately, which would have given readers a better grasp on the implications of these complications to the recovery of these patients.

Over the last two decades, there has been a significant increase in the number of prophylactic mastectomies performed every year, which has also increased the number of bilateral breast reconstructions (10,11). Although prophylactic mastectomies reduce the risk of breast cancer in certain high-risk populations and may decrease the level of anxiety in some patients, there have not been shown to be beneficial in terms of cancer risk reduction for all patients. In fact, existing data suggest that there is no survival advantage and uncertain oncologic benefit of contralateral prophylactic mastectomy in women with early

stage unilateral breast cancer (12,13). In addition, several prior studies have found higher morbidity with bilateral, as opposed to unilateral breast reconstruction (14,15). The authors of this prospective study have also shown that bilateral reconstructions had higher complication rates compared to unilateral reconstructions. Although the choice between contralateral prophylactic mastectomy or a unilateral mastectomy is complex and involves numerous factors, the consequences of bilateral reconstruction have to be thoroughly explained by the surgeon and carefully considered by the patient when faced with this difficult decision in the preoperative setting.

The authors should also be complimented for going one step further in comparing the 2-year complications across the different techniques by using separate mixed-effects logistic regression models for any type of complication, re-operative complications, and wound infections. It was noted that older women and smokers were independently associated with a higher risk of overall complications and re-operations, while patients with an increased body mass index and those that required radiotherapy had a higher likelihood of wound infection in addition to the higher likelihood of overall complications and re-operative complications. These findings align with previous studies showing that older age, obesity, smoking, and history of radiotherapy contribute to higher surgical risk and ultimately affect outcomes due to increased complications (9,10,16-19).

There is no study without limitations. The authors excluded patients who did not complete the study questionnaire and thus this does not represent a true "intention to treat" population. Additionally, reconstructive techniques were selected by the patient and surgeon based on previously reported outcomes on each reconstructive modality. Although this introduces some bias to the cohort, the high volume of patients operated on by many different surgeons across the eleven study sites potentially mitigates this bias. The authors should be commended for the extended two year follow up given that other studies on this topic have considerably shorter follow up periods. However, we have to be cautious when interpreting the higher complication rates in the autologous tissue-based reconstructions when compared to the implant-based reconstructions. Autologous reconstructions have the disadvantage of longer initial recovery and potential for more problems in the early postoperative period with minimal need for long-term maintenance for the majority of the cases, whereas implant-based reconstructions usually have a faster initial recovery with lower complications but

they are more likely to fail or need additional operations in the long run. As correctly mentioned by the authors, longitudinal studies capable of measuring long-term, implant-related complications are needed to facilitate informed decision making. We believe that patients care just as much, if not more, about the long-term result rather than the short-term complications they encounter early in their reconstruction, particularly if these complications are manageable and do not result in reconstruction failure. Furthermore, more information regarding the type of implant-based reconstruction, such as technique details (total submuscular coverage, use of acellular dermal matrix, etc.) or implant type, would have allowed a better understanding of the higher failure rates noted following these reconstructions. Finally, it would have been ideal to correlate the complication data with patient reported outcomes data (i.e., BREAST-Q scores) as this would potentially give patients a better understanding regarding the quality of life and satisfaction they can expect during and after their reconstructive journey.

Overall, we congratulate the authors for their work and contributions to the body of literature in this interesting field of plastic surgery. A more comprehensive insight into the risks associated with the various breast reconstruction options after a mastectomy has significant implications to a surgeon's practice. This certainly helps the surgeon counsel the patient in the pre-operative setting, but may also reinforce the seriousness of the operation and likelihood that a complication may be encountered at some point during the reconstructive process given that the overall complication rate approaches one out of three patients.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Annals of Breast Surgery*. The article did not undergo external peer review.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/abs.2018.11.01>). NSK serves as an unpaid editorial board member of *Annals of Breast Surgery* from Aug 2018 to Jul 2020. The other authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Open Access Statement: This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

1. Bailey CR, Ogbuagu O, Baltodano PA, et al. Quality-of-Life Outcomes Improve with Nipple-Sparing Mastectomy and Breast Reconstruction. *Plast Reconstr Surg* 2017;140:219-26.
2. Elder EE, Brandberg Y, Björklund T, et al. Quality of life and patient satisfaction in breast cancer patients after immediate breast reconstruction: a prospective study. *Breast* 2005;14:201-8.
3. Santosa KB, Qi J, Kim HM, et al. Effect of Patient Age on Outcomes in Breast Reconstruction: Results from a Multicenter Prospective Study. *J Am Coll Surg* 2016;223:745-54.
4. Oh DD, Flitcroft K, Brennan ME, et al. Patient-reported outcomes of breast reconstruction in older women: Audit of a large metropolitan public/private practice in Sydney, Australia. *Psychooncology* 2018;27:2815-22.
5. Bennett KG, Qi J, Kim HM, et al. Comparison of 2-Year Complication Rates Among Common Techniques for Postmastectomy Breast Reconstruction. *JAMA Surg* 2018;153:901-8.
6. Billig J, Jagsi R, Qi J, et al. Should Immediate Autologous Breast Reconstruction Be Considered in Women Who Require Postmastectomy Radiation Therapy? A Prospective Analysis of Outcomes. *Plast Reconstr Surg* 2017;139:1279-88.
7. Jagsi R, Momoh AO, Qi J, et al. Impact of Radiotherapy on Complications and Patient-Reported Outcomes After Breast Reconstruction. *J Natl Cancer Inst* 2018;110.
8. Ho AY, Hu ZI, Mehrara BJ, et al. Radiotherapy in the setting of breast reconstruction: types, techniques, and timing. *Lancet Oncol* 2017;18:e742-53.

9. Xu F, Sun H, Zhang C, et al. Comparison of surgical complication between immediate implant and autologous breast reconstruction after mastectomy: A multicenter study of 426 cases. *J Surg Oncol* 2018;118:953-8.
10. Bletsis P, Bucknor A, Chattha A, et al. Evaluation of Contralateral and Bilateral Prophylactic Mastectomy and Reconstruction Outcomes: Comparing Alloplastic and Autologous Reconstruction. *Ann Plast Surg* 2018;80:S144-9.
11. Cemal Y, Albornoz CR, Disa JJ, et al. A paradigm shift in U.S. breast reconstruction: Part 2. The influence of changing mastectomy patterns on reconstructive rate and method. *Plast Reconstr Surg* 2013;131:320-6e.
12. Chung A, Huynh K, Lawrence C, et al. Comparison of patient characteristics and outcomes of contralateral prophylactic mastectomy and unilateral total mastectomy in breast cancer patients. *Ann Surg Oncol* 2012;19:2600-6.
13. Lostumbo L, Carbine NE, Wallace J. Prophylactic mastectomy for the prevention of breast cancer. *Cochrane Database Syst Rev* 2010;CD002748.
14. Silva AK, Lapin B, Yao KA, et al. The Effect of Contralateral Prophylactic Mastectomy on Perioperative Complications in Women Undergoing Immediate Breast Reconstruction: A NSQIP Analysis. *Ann Surg Oncol* 2015;22:3474-80.
15. Miller ME, Czechura T, Martz B, et al. Operative risks associated with contralateral prophylactic mastectomy: a single institution experience. *Ann Surg Oncol* 2013;20:4113-20.
16. Massenburg BB, Sanati-Mehrziy P, Ingargiola MJ, Rosa JH, Taub PJ. Flap Failure and Wound Complications in Autologous Breast Reconstruction: A National Perspective. *Aesthetic Plast Surg* 2015;39:902-9.
17. Momoh AO, Ahmed R, Kelley BP, et al. A systematic review of complications of implant-based breast reconstruction with prereconstruction and postreconstruction radiotherapy. *Ann Surg Oncol* 2014;21:118-24.
18. Hirsch EM, Seth AK, Kim JY, et al. Analysis of risk factors for complications in expander/implant breast reconstruction by stage of reconstruction. *Plast Reconstr Surg* 2014;134:692-9e.
19. Henderson MM, Neumeister MW, Bueno RA Jr. Hand tumors: I. skin and soft-tissue tumors of the hand. *Plast Reconstr Surg* 2014;133:154-64e.

doi: 10.21037/abs.2018.11.01

Cite this article as: Kaoutzanis C, Vranis N, Karp NS. Are we closer to understanding the true morbidity following postmastectomy breast reconstruction? *Ann Breast Surg* 2018;2:18.