



A plastic surgery perspective on the choice between breast conserving surgery with radiotherapy versus mastectomy and reconstruction

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We congratulate Dr. Diao and colleagues on their excellent article comparing patient-reported quality of life (QOL) outcomes following breast conserving surgery with radiotherapy (BCS + RT) versus mastectomy and reconstruction (Mast + Recon) (1). Their study is impressively powered with long-term follow-up and sound, detailed methodology. Their findings, that the two treatments were similar in terms of satisfaction with breasts, physical well-being, and upper extremity function, while Mast + Recon was associated with worse sexual well-being but better physical function, align with the previous literature as well as our clinical experiences. In this commentary, we hope to complement the thoughts of the radiation oncologists who authored the paper by providing another perspective on this multidisciplinary topic.

As reconstructive plastic surgeons, we counsel patients on the decision between BCS + RT and Mast + Recon on a near-daily basis. While surgically involved in only the latter strategy, we frequently discuss the advantages and disadvantages of each treatment given their oncologic equivalency. In these conversations, we are asked to describe the most likely aesthetic outcomes of each option, the risks for complications, and discuss patient-specific factors that might influence patient and surgeon towards one procedure

or the other. Studies like this one can help to better inform these conversations and, ultimately, lead to more satisfied patients.

Both BCS + RT and breast reconstruction were developed to alleviate the negative effects of mastectomy. Despite this common objective, the two approaches are not equally appropriate for every woman with early-stage breast cancer. In our experience, several specific factors serve as relative indications or contraindications for each procedure and influence our discussions with patients. For example, women with large breasts or pre-existing asymmetry (with a larger affected side) may not suffer a major aesthetic deformity with a relatively small BCS excision. Patients with very large breasts may even benefit from oncoplastic reduction, in which BCS + RT is combined with simultaneous bilateral breast reduction (2,3). Conversely, patients with small or medium-sized breasts are more likely to notice the asymmetry rendered by lumpectomy and RT, both of which reduce the treated breast.

Moreover, Diao *et al.*'s finding, of an association between BCS + RT and worse upper extremity function, alludes to a well-known effect of radiation-induced fibrosis of the chest and upper arm tissues and must be emphasized in conversations with women who are physically active (4,5).

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It is noteworthy, however, that radiotherapy for breast cancer has undergone substantial changes over the past 20 years. Hence, patients who have undergone radiotherapy may, in fact, represent a rather heterogeneous cohort, with treatment modalities ranging from whole breast radiation to intensity-modulated protocols and partial breast radiation. A complete discussion of radiotherapy modalities, however, is beyond the scope of this commentary. On the other hand, the negative connection between Mast + Recon and sexual function is predictable given the nipple denervation inherent in mastectomy and is disclosed to every patient in our breast reconstruction clinic (6,7). Patients who undergo implant-based reconstruction will have a prosthesis interposed between the breast skin and underlying tissues making some level of breast skin and nipple numbness inevitable. These examples highlight just a few of the many variables that direct our recommendations to patients considering BCS + RT versus Mast + Recon on a case-by-case basis.

The structure of Diao *et al.*'s study, therefore, while experimentally sound, serves to answer a question that rarely presents itself, in our experience. That is, we see few women who are truly agnostic about the choice between BCS + RT versus Mast + Recon or who clearly self-select into one treatment group or the other. Instead, the fact that BCS + RT and Mast + Recon were found to be largely equivalent in terms of QOL outcomes in Diao *et al.* emphasizes the importance of focusing on specific, often subjective, patient factors when making treatment recommendations. The significant differences in baseline characteristics between the two groups (in terms of age, ethnicity, smoking status, body mass index, bra cup size, household income, tumor size, and rate of bilateral breast cancer) further complicate interpretations of the survey data and allude to the many variables that influence patient preferences and post-operative QOL. Numerous prior studies on the topic of breast reconstruction have demonstrated the complex relationships between specific baseline patient characteristics, treatment preferences, and levels of satisfaction. For example, the national trend mentioned by Diao *et al.*, toward increasing rates of contralateral prophylactic mastectomy, was recently shown to be driven by younger patients seeking implant-based, immediate breast reconstruction (8). Until similar associations are fully understood, conclusions from studies like this one should inform, but not direct, the decision-making processes of patients and surgeons.

One point from the article that we, as reconstructive microsurgeons, must comment on is the superiority of

autologous reconstruction. In the study, satisfaction with breasts and physical well-being scores were significantly higher for autologous reconstruction compared to either implant-based reconstruction or BCS + RT. Autologous reconstruction was also not found to have the negative effect on sexual well-being associated with implant-based reconstruction. These findings echo decades of plastic surgery research showing that autologous breast reconstruction is superior to implants in terms of QOL, aesthetics, complication rates, durability, and functional outcomes (9,10). A landmark study in this regard was the Mastectomy Reconstruction Outcomes Consortium (MROC) study. Among other questions, the MROC study investigated patient-reported outcomes 1 year after immediate breast reconstruction and demonstrated that patients who had undergone autologous reconstruction had greater satisfaction with their breasts and had greater psychosocial and sexual well-being than those who underwent who underwent implant-based reconstruction (11).

At present, the only common legitimate reasons to avoid autologous reconstruction are operative duration and surgeon unfamiliarity with alternative donor sites when abdominal tissue is unavailable or insufficient. While the length of autologous reconstruction surgery may result in increased upfront costs, the reduction in complications and elimination of required implant maintenance (i.e., routine imaging, replacement in the case of rupture) may nullify this concern (12,13). In combination with nipple-sparing mastectomy, microsurgical breast reconstruction is safe and replicates the original appearance and quality of the breast better than any other treatment strategy. Given these proven advantages, it is incumbent on plastic surgeons to continue to improve microsurgical techniques, accelerate post-operative recovery, and increase the availability of our gold standard operation among women with breast cancer.

Diao *et al.*'s conclusion that their data "*demonstrating similar clinically meaningful long-term QOL outcomes between BCS + RT and Mast + Recon*" suggest a relative equivalency between strategies that favors BCS + RT in most cases due to reduced surgical complexity. Our takeaway is different: the absence of clear QOL contraindications to either procedure underscores the importance of accounting for specific patient characteristics and priorities when discussing surgical options with women who have breast cancer. Every woman faced with the dilemma between BCS + RT and Mast + Recon cares about their aesthetic and functional results and deserves to make an individualized, informed decision that includes consultation with a board-certified

plastic surgeon.

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