



## Review

## Comparison of immediate breast reconstruction after mastectomy and mastectomy alone for breast cancer: A meta-analysis

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### Abstract

**Background:** The purpose of this study was to compare patient outcomes between immediate breast reconstruction (IBR) after mastectomy and mastectomy alone.

**Methods:** We conducted a comprehensive literature search of PUBMED, EMBASE, Web of Science, and Cochrane Library. The primary outcomes evaluated in this review were overall survival, disease-free survival and local recurrence. Secondary outcome was the incidence of surgical site infection. All data were analyzed using Review Manager 5.3.

**Results:** Thirty-one studies, involving of 139,894 participants were included in this paper. Pooled data demonstrated that women who had IBR after mastectomy were more likely to experience surgical site infection than those treated with mastectomy alone (risk ratios 1.51, 95% CI: 1.22–1.87;  $p = 0.0001$ ). There were no significant differences in overall survival (hazard ratios 0.92, 95% CI: 0.80–1.06;  $p = 0.25$ ) and disease-free survival (hazard ratios 0.96, 95% CI: 0.84–1.10;  $p = 0.54$ ) between IBR after mastectomy and mastectomy alone. No significant difference was found in local recurrence between two groups (risk ratios 0.92, 95% CI: 0.75–1.13;  $p = 0.41$ ).

**Conclusions:** Our study demonstrates that IBR after mastectomy does not affect the overall survival and disease-free survival of breast cancer. Besides, no evidence shows that IBR after mastectomy increases the frequency of local recurrence.

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**Keywords:** Immediate breast reconstruction; Mastectomy; Breast cancer

### Introduction

Breast cancer is the most common cancer and the second cause of cancer death, with an estimated 232,340 new cases and 39,620 died of the disease among US women in 2013. It is estimated that 1 in 8 American women will develop

breast cancer in her lifetime.<sup>1</sup> Mastectomy is a common treatment for breast cancer. About 57% of women diagnosed with early stage (I or II) breast cancer undergo breast-conservation surgery (BCS), 36% have a mastectomy. Among women with late-stage (III or IV) breast cancer, 13% have BCS, 60% select to undergo mastectomy.<sup>2</sup> However, previous studies have proved that mastectomy can lead to not only various physical problems, such as the inability to breast-feed, loss of sensation of the chest skin, impairment of body image and sexual function, but also emotional disturbances, such as anxiety and depression.<sup>3</sup> Some surgeons recommend the use of external

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prosthesis to deal with these issues. However, the external prosthesis is inconvenient and uncomfortable. Therefore, new solutions need to be explored in order to reduce the physical and psychological problems caused by mastectomy.

Studies suggest that immediate breast reconstruction (IBR) after mastectomy can restore body image, improve vitality, femininity, and sexuality, and have positive impacts on patient's psychological well-being and quality of life, especially in young women.<sup>4–6</sup> Besides, IBR after mastectomy neither increases the risk of local recurrence nor delays adjuvant therapy.<sup>7–9</sup>

However, in spite of the above benefits of IBR after mastectomy, many surgeons and patients remain unconvinced whether IBR after mastectomy affects breast cancer recurrence and patients' survival.<sup>9–12</sup> Some studies have shown that women with breast cancer who undergo IBR after mastectomy had higher breast cancer-specific survival rates than those who undergo mastectomy alone.<sup>5,9,13–17</sup> On the contrary, other retrospective studies indicated that there were no significant differences between IBR after mastectomy and mastectomy alone in recurrence and survival.<sup>6,18–21</sup> Hence, we performed a meta-analysis to compare the overall survival, disease-free survival, local recurrence, and surgical site infection between patients who underwent IBR after mastectomy and mastectomy alone.

## Methods

### Search strategy

The following databases were systematically searched in July 2015 without language and publication date restrictions: PUBMED, EMBASE, Web of Science, and Cochrane Library. In addition, the relevant references in the list of all included articles were also checked. The search term included “breast cancer” and “breast reconstruction” in combination with “mastectomy”. When the patient material was reported more than once, we selected the article with the most complete data in this meta-analysis. If the applicability of an article could not be determined by title or abstract alone, the full text was reviewed. Any disagreements were decided by a third reviewer (Chuntao Wu).

### Study inclusion and exclusion criteria

The studies were selected if they fulfilled the following inclusion criteria: (1) Retrospective or prospective studies. (2) Female patients with a diagnosis of breast cancer. (3) Comparison between immediate breast reconstruction after mastectomy with mastectomy alone. (4) Report on at least one of the outcome measures mentioned below. (5) Data was extractable in full publications. Exclusion criteria: (1) Studies evaluated less than 30 patients. (2) Abstracts,

letters, editorials and expert opinions. (3) Reviews without original data, meta-analysis, case reports and studies lacking control groups were also excluded.

### Types of outcome measures

The primary outcomes evaluated in this review were overall survival (OS), disease-free survival (DFS) and local recurrence (LR). Secondary outcome was the incidence of surgical site infection (SSI). Local recurrence was defined as any recurrence in the ipsilateral mastectomy site.

### Data extraction and management

Two authors independently extracted data from the selected studies. We recorded the following information for each study according to a prespecified protocol: First author, year of publication, study demographics, number and characteristics of participants, type of reconstruction, duration of follow-up, end-point data (OS, DFS, LR, and SSI), and quality of the study. Any disagreement was resolved through consultation with the third reviewer.

### Quality of the evidence recommendations methodology

The quality of the nonrandomized studies was assessed using the Newcastle–Ottawa Scale (NOS).<sup>22</sup> It has three categories including selection, comparability, and exposure for case–control and cohort studies. The selection category contains four items (The case definition's representativeness of the cases, selection of controls, and definition of controls). The comparability category contains two items (study controls for the most important factor or study controls for any additional factor). The exposure category contains three items (ascertainment of exposure, same method of ascertainment for cases and controls, and non-response rate). A study can be awarded a maximum of one star for each numbered item within the selection and exposure categories. A maximum of two stars can be given for the Comparability category. A star rating of 0–9 was allocated to each study based on these parameters. More than six stars were considered to be of high quality. Two authors independently assessed the quality of the included studies. Discrepancies were re-examined, and a consensus was reached by discussion.

### Statistical analysis

We analyzed the data by the Review Manager software 5.3 (updated by the Cochrane Library for Systematic Reviews). Dichotomous outcomes, such as local recurrence or surgical site infection, were expressed risk ratio (RR) with 95% Confidence interval (CI). Time-to-event outcomes,<sup>23</sup> like overall survival and disease-free survival, we calculated hazard ratio (HR) and 95% CI. The log HR

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