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REVIEW

Is immediate autologous breast reconstruction with postoperative radiotherapy good practice?: A systematic review of the literature

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Aesthetic outcome

Summary *Background:* There remains controversy as to whether immediate autologous breast reconstruction with postoperative radiotherapy is associated with acceptable complications and aesthetic outcomes. This systematic review analyses the literature regarding outcomes of immediate autologous breast reconstruction with postoperative radiotherapy compared with no radiotherapy, as well as with delayed autologous breast reconstruction following post-mastectomy irradiation.
Methods: Pubmed (1966 to October 2012), Ovid MEDLINE (1966 to October 2012), EMBASE (1980 to October 2012), and the Cochrane Database of Systematic Reviews (Issue 10, 2012) were searched. Overall complications (including fat necrosis), fat necrosis, revisional surgery, loss of volume, and aesthetic outcome, were analysed individually. Comparable data from observational studies were combined for meta-analysis where possible and quality assessment of the studies was performed.
Results: The majority of studies of immediate autologous breast reconstruction and postoperative radiotherapy reported satisfactory outcomes (19 of 25 studies; $n = 1247$ patients). Meta-analysis of observational studies demonstrated no significant differences in total prevalence of complications ($p = 0.59$) or revisional surgery ($p = 0.38$) and a summary measure for fat necrosis favouring the group without radiotherapy (OR 2.82, 95% CI 1.35—5.92, $p = 0.006$). The majority of studies comparing immediate reconstruction and postoperative radiotherapy with

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delayed reconstruction following post-mastectomy radiotherapy (10 of 12 observational studies; $n = 1633$ patients) reported satisfactory outcomes following immediate reconstruction. Meta-analysis of observational studies demonstrated no significant difference in overall incidence of complications ($p = 0.53$) and fat necrosis (OR 0.63, 95% CI 0.29—1.38, $p = 0.25$), and a summary measure for revisional surgery (OR 0.15, 95% CI 0.05—0.48, $p = 0.001$) favouring the delayed surgery group. No randomised-controlled trials met the inclusion criteria, and all of the observational studies included were missing more than one important component for reporting of observational studies.

Discussion: The majority of studies reported satisfactory outcomes and a similar incidence of complications for immediate autologous breast reconstruction and adjuvant radiotherapy when compared with no radiotherapy or delayed reconstruction following radiotherapy; the proportion that required revisional surgery was higher though for immediate than delayed breast reconstruction. The findings are limited by the paucity of high quality data in the published literature, and until better data is available the findings of this review suggest that immediate autologous breast reconstruction should at least be considered when adjuvant chest wall radiotherapy is anticipated.

Introduction

The current clinical indications for post-mastectomy radiotherapy lead many patients to receive radiotherapy as part of their treatment for breast cancer. Clinical evidence from randomised trials of post-mastectomy radiation and a meta-analysis of these studies has established the importance of local control on long-term breast cancer-specific and overall survival.[1—8] The Early Breast Cancer Trialists' Collaborative Group examined the effect of radiotherapy and extent of surgery on clinical outcomes using individual patient data from 42,000 women in 78 randomised trials and found that the absolute reduction in the 5-year rate of locoregional recurrence was proportional to the absolute reduction in 15-year breast cancer mortality with a 4:1 ratio.[7,8] There is international consensus that patients with T3 or T4 tumours or at least four positive axillary lymph nodes require adjuvant radiotherapy,[1,5,9—12] however the role of post-mastectomy radiation therapy in the treatment of patients with T1 or T2 tumours and one to three positive axillary nodes remains the subject of randomised trials but has the potential to dramatically increase the number of patients that will require post-mastectomy radiotherapy.

Immediate breast reconstruction surgery has well-established advantages including a single operation, period of hospitalisation, and postoperative recovery period, as well as reduced overall costs, superior cosmetic results, and a reduced need for symmetrising surgery when compared with delayed breast reconstruction.[13—23] Reconstructive surgeons face the challenge of integrating radiotherapy and breast reconstruction in an increasing number of breast cancer patients. Whilst it is generally accepted that radiation negatively influences the outcome of implant-based breast reconstruction, the effects of radiotherapy on the late complications and aesthetic outcomes of autologous breast reconstruction remain unclear. Although some studies and reviews have advocated avoidance of post-reconstruction irradiation due to higher prevalence of complications, unpredictable volume loss, and unsatisfactory aesthetic outcomes, others have challenged these assumptions, in particular recent studies using contemporary radiotherapy regimens.[24—58]

The aim of this systematic review was to comprehensively review and analyse the reported effects of post-operative radiotherapy on outcomes of immediate autologous breast reconstruction without implant compared with no radiotherapy, and also with delayed reconstruction following post-mastectomy irradiation. This review also evaluates and critically appraises the quality of the published studies that currently inform practice.

Methods

Pubmed (1966 to October 2012; searched for Text Words), Ovid MEDLINE (1966 to October 2012), EMBASE (1980 to October 2012), and the Cochrane Database of Systematic Reviews (Issue 10, 2012) were searched for the following terms: breast reconstruction AND flap AND radiotherapy OR irradiation OR radiation. Only English language and full text articles were included. Full text articles were then cross-referenced. All studies that reported outcomes of autologous breast reconstruction without using a prosthesis were included. Potentially relevant publications were identified using the search strategy and screened for retrieval by authors MS and SM. The latest search was performed on 1st October 2012. More than 400 potentially relevant publications were identified using the search strategy (Figure 1). No randomised-controlled trials were identified.

Only data on outcomes of immediate autologous breast reconstruction with postoperative adjuvant radiotherapy, immediate autologous reconstruction without post-operative radiotherapy, and delayed autologous breast reconstruction following adjuvant radiotherapy, were extracted from studies meeting the inclusion criteria. Studies where the data could not be accurately extracted or where patient number totalled less than ten were excluded. Only complications that were reported in all studies were included, and therefore anastomotic