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IMMEDIATE VERSUS DELAYED CONTRALATERAL BREAST SYMMETRISATION IN BREAST RECONSTRUCTION WITH LATISSIMUS DORSI FLAP: A COMPARATIVE STUDY

Syventävien opintojen kirjallinen työ
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HARKKILA SOFIA: Välittömän ja viivästetyn vastapuolen rinnan symmetrisaation vertaileva tutkimus Latissimus Dorsi -rintarekonstruktion yhteydessä

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Rintasyövän vuoksi tehtävän rinnan poistoleikkauksen yhteydessä tai sen jälkeen voidaan tehdä rinnan uudelleenrakennusleikkaus eli rintarekonstruktio leveästä selkälihaksesta (Latissimus dorsi, LD) tehtävää kielekettä apuna käyttäen. Symmetrian saavuttaminen toispuoleisella kielekkeellä vaatii usein myös vastapuolen korjaavan toimenpiteen. Toimenpiteen yleisyydestä huolimatta kirjallisuudesta löytyy suhteellisen vähän tietoa vastapuolen rinnan symmetrisaation ideaalisesta ajoittamisesta.

Välittömän symmetrisaation mahdollisia etuja on vain yhden operaatiokerran tarve ja näin ollen mahdollisimman lyhyt sairaalassa vietetty aika, mikä säästää rahaa ja resursseja. Etuna on myös välttyminen epäsymmetristen rintojen mahdollisesti aiheuttamalta vaivalta ja mahdollisuus koepalan ottoon vastapuolen rinnasta maligniteetin varalta. Toisaalta välitön symmetrisaatio saattaa aiheuttaa lisää korjausleikkauksia ja kasvattaa komplikaatioiden määrää ja vaikeuttaa myöhempiä onkologisia hoitoja.

Tämän tutkimuksen tarkoituksena on verrata komplikaatioiden ja korjausleikkauksien tarpeen esiintymistä välittömän ja viivästetyn symmetrisaation välillä LD -rintarekonstruktion yhteydessä. Tutkimuksessa oletettiin, että samanaikaisesti alkuperäisen rekonstruktion kanssa suoritettava tasapainottava toimenpide saattaisi vähentää myöhempien toimenpiteiden tarvetta tarjoten välittömän symmetrian. Vertaileva retrospektiivinen tutkimus sisälsi 78 potilasta, joille tehtiin toispuoleinen LD -rintarekonstruktio ja vastapuolen symmetrisaatio tammikuun 2014 ja kesäkuun 2016 välillä Turun yliopistollisessa keskussairaalassa. Potilaat jaettiin kahteen ryhmään symmetrisaation ajoittumisen perusteella: välittömään ja viivästettyyn ryhmään. Postoperatiivista komplikaatiosta, lopputuloksesta ja re-operaatiosta tehtiin vertailu ryhmien välillä.

Myöhemmän korjausleikkauksen läpikävi yhteensä 25 (32 %) potilasta, joista 24 % oli välittömässä ryhmässä ja 43 % viivästetyssä ryhmässä. Tuloksissa ei ollut tilastollisesti merkitsevää eroa lukuun ottamatta rasvansiirtorevisioita, joita tehtiin enemmän viivästetyssä ryhmässä. Suurimmalle osalle välittömän ryhmän potilaista (76 %) ei tehty myöhempää korjausleikkausta. Ryhmien välisissä komplikaatioissa ei havaittu tilastollisesti merkitseviä eroja. Näin ollen välittömän symmetrisaation suorittaminen rintarekonstruktion yhteydessä on käyttökelpoinen vaihtoehto, joka saattaa aiheuttaa samanlaisen korjausleikkausten tarpeen kuin viivästetty symmetrisaatio ilman suurempaa komplikaatioriskiä.

Avainsanat: Latissimus dorsi, Rintarekonstruktio, Välitön symmetrisaatio, Viivästetty symmetrisaatio

Research Article

Immediate versus delayed contralateral breast symmetrisation in breast reconstruction with latissimus dorsi flap: a comparative study

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Keywords: Latissimus dorsi, Breast reconstruction; Symmetrisation; Immediate; Delayed;

Abstract

To achieve symmetry in unilateral free flap breast reconstruction often requires a contralateral procedure. There is no evidence in the literature to support the benefit of immediate contralateral breast symmetrisation concomitant to the breast reconstruction. We hypothesized that performing a simultaneous contralateral balancing operation at the time as the initial reconstruction might provide immediate symmetry and minimize the frequency of secondary procedures. Thus, we performed a comparative study on this issue. A comparative retrospective study was conducted in 78 consecutive patients underwent unilateral breast reconstruction surgery with latissimus dorsi flap (LD) and contralateral breast symmetrisation from January 2014 to June 2016 at Turku University Hospital. Exclusion criteria included other breast reconstruction techniques and no contralateral symmetrisation at follow-up. The patients were divided according to the timing of contralateral breast balancing operation into an immediate versus a delayed group. Postoperative complications, outcomes and re-operations were compared. Baseline characteristics were well balanced between the groups except for comorbidity, which was significantly higher in the immediate group. Mastectomy weights (735.6 vs 390.7 g, $p = 0.015$), contralateral breast reduction weights (268.3 vs 105.8 g, $p = 0.014$), and implants size (218.9 vs. 138.9 g, $p = 0.001$) were significantly larger in the immediate group. No significant differences in any kind of complications were detected. Similarly, the rates of re-operations were similar among the groups (24.0 vs. 43.3 %, $p = 0.134$). Performing immediate symmetrisation at the time of breast reconstruction is safe and feasible in autologous LD breast reconstructions, where 76 % did not require a second operation for symmetry. There were no differences in the rate of any re-operation and, therefore, performance of simultaneous contralateral reduction is a reasonable option.

Introduction

The latissimus dorsi (LD) flap has been proven to be a very reliable and versatile method and is one of the best options for both immediate and delayed breast reconstructions with minimal donor site morbidity [1-4]. Beyond the consensus regarding this reconstructive procedure, its use has traditionally been limited by the desired size of the reconstructed and contralateral breast. To overcome any shortfall in final volume, the flap is very often routinely augmented at the time of its harvest by the positioning of breast implants or autologous fat [5]. To further improve the aesthetic outcomes, a contralateral balancing procedure may be offered including breast reduction, mastopexy or augmentation to obtain symmetrical breast mounds [6]. Symmetrisation procedures of the contralateral healthy breast have become an essential part of postmastectomy reconstructions, allowing the surgeon to reach the final goal of breast symmetry.

Even though contralateral procedures are performed to improve symmetry, an asymmetry between the 2 breasts might occurs over time because of the difference of the tissue between the natural breast parenchyma and the reconstructed breast. Despite its prevalence, there is limited literature that addresses the timing of the contralateral breast symmetrisation [7]. Possible advantages of immediate symmetrisation include a single operation and hospital admission with associated morbidity reductions and cost-savings for patients and healthcare providers, as well as reduced patients' distress due to breast asymmetry and the opportunity to sample contralateral breast tissue for occult malignancy [5, 7, 8]. On the other hand, immediate symmetrisation may result in more revisions and complications, even compromising further oncological treatments [7]. Nonetheless, ancillary breast procedures to achieve optimal aesthetic outcomes after primary reconstruction constitute a rising workload for any Plastic Surgery service [9].

Thus, the ideal timing of contralateral breast symmetrisation with unilateral breast reconstruction remains controversial. The aim of this study was to compare the revision and complication rates between immediate and delayed contralateral symmetry procedure in unilateral LD breast reconstruction. We hypothesized that performing an immediate symmetrisation at the time of breast reconstruction might reduce further procedures after autologous LD breast reconstructions.

Materials and Methods

This is a retrospective chart review of all consecutive patients who underwent unilateral breast reconstruction surgery using LD flap and any contralateral healthy breast reduction or mastopexy after mastectomy from January 2014 to June 2016 at Turku University Hospital, Turku, Finland. All patients who underwent contralateral healthy breast symmetry procedures were included in this

analysis. Thus, patients who underwent LD reconstruction, but did not receive any contralateral breast symmetrisation procedures were excluded. The indications for LD breast reconstruction and contralateral healthy breast symmetrisation were at the discretion of the individual surgeon agreed with the patient. The patients were divided into 2 group according to the timing of contralateral healthy breast symmetrisation: immediate or delayed group.

The medical records were reviewed for demographics, comorbidities, treatment characteristics, including radio- and chemotherapy therapy, timing of initial LD reconstruction, and timing and type of symmetry procedure performed. Postoperative complications included all complications that occurred in the delayed group in the initial LD flap procedure and, later, during the contralateral procedure, in order to assess and better quantify the differences between the 2 surgical strategies.

Nipple-areolar-complex reconstructions were not considered as surgical revisions because in our institution they are routinely performed under local anesthesia at an outpatient setting. Similarly, minor scar and surgical revisions performed under local anesthesia were excluded from the analysis. Therefore, all reported revisions on the contralateral healthy breast were performed in an operating room under general anesthesia and included secondary mastopexy or reduction, implant exchange or removal, capsulotomy or capsulectomy, seroma, wound revisions, major dog ear excisions and scar revisions, and fat grafting.

Wound infection was defined as any surgical wound requiring antimicrobial treatment for superficial infection, emergency drainage or hospital admission for deep infection. Wound dehiscence was defined as a wound breakdown with full-thickness skin separation extending 0.5 cm with or without infection, resulting in delayed healing, >2 weeks or demanding specialist dressing care. Seroma was defined as collection of serous fluid or blood between tissues, identified through a clinical examination or ultrasound imaging and requiring percutaneous or operative drainage. Hematomas included hemorrhages requiring blood cell transfusion or emergency exploration in the operating room.

Our primary outcome measure was the rate of all-cause revision surgery between the groups. Secondary outcome measures included details of the operative technique (mastectomy weight, implant volume, reduction weight, operative time), hospital stay, and return to work.

The results of parametric and nonparametric data were expressed as mean ± SD, and SPSS statistical software (SPSS 23.0, Chicago, IL, U.S.A) was used for all statistical analyses. Comparisons between the 2 groups were performed using the chi-square test or Fisher's exact test when appropriate. Continuous variables were compared using the analysis of variance test. CIs were set at 95 %. A two-sided p value of ≤ 0.05 was considered as statistically significant.

Results

Of 113 consecutive patients undergoing unilateral LD flap for breast reconstruction, 78 (69.0 %) patients underwent a contralateral symmetry procedure, immediately in 48 cases and delayed in other 30 cases. Average patient age was 55.9 years (range, 34 - 70 years), and average BMI was 27.2 (range, 19 - 42 kg/m²). Table 1 outlines the 2 study groups, which did not present any significant differences in demographics and pre-operative data; the 2 groups were well balanced. 75 % of the patients required a breast implant together with LD flap.

Table 1. Demographics of the patients at time of the study

	Immediate Group (n = 48)	*Delayed Group (n = 30)*	*p-value*
Mean age ± SD, years	55.0 ± 7.5	59.0 ± 8.7	0.130
Mean BMI ± SD, kg/m²	27.2 ± 3.9	26.9 ± 6.4	0.829
Any comorbidity, n (%)	35 (73.9)	22 (73.3)	0.975
Diabetes, n (%)	4 (8.3)	4 (13.3)	0.565
HTA, n (%)	13 (27.1)	12 (40.0)	0.341
Lipid disease, n (%)	6 (12.5)	8 (26.7)	0.190
Depression, n (%)	5 (10.4)	2 (6.7)	0.654
Smokers, n (%)	10 (20.8)	2 (6.7)	0.207
BRCA, n (%)	3 (6.3)	0 (0.0)	0.325
Radiotherapy, n (%)	22 (78.6)	18 (60.0)	0.394
Chemotherapy, n (%)	38 (80.9)	18 (60.0)	0.101

Significant differences were detected in the implant size, breast mastectomy resection weight and breast reduction/mastopexy weight in the immediate symmetrisation group (Table 2). Other parameters, like estimated blood loss, length of hospital stay and follow-up duration were similar between the 2 groups. The mean time to the contralateral breast symmetrisation for the delayed group was 9.4 ± 4.2 months from the initial breast reconstruction.

Table 2. Comparison of perioperative parameters in the 2 groups of patients

	Immediate Group (n = 48)	*Delayed Group (n = 30)*	*p-value*
Operative time, min	233.8 ± 58.5	212.6 ± 63.7	0.359
Breast mastectomy resection weight, g	735.6 ± 298.4	390.7 ± 136.5	*0.015*
Breast implant size (when used)	218.9 ± 67.0	138.9 ± 23.1	*0.001*
Breast reduction/mastopexy symmetrisation weight, g	268.3 ± 225.9	105.8 ± 140.9	*0.014*
Estimated blood loss, ml	257.2 ± 121.6	259.1 ± 207.1	0.968
Hospital stay, days	4.2 ± 1.1	4.0 ± 0.7	0.572
Follow-up, months	34.7 ± 18.2	28.1 ± 19.9	0.258

No significant differences were observed among overall complications nor among specific surgical site complications. Similarly, there were no significant differences among specific wound healing complications between the 2 groups (Table 3).

Table 3. Postoperative complications

	Immediate Group (n = 48)	*Delayed Group (n = 30)*	*p-value*
Complications	20 (41.6%)	18 (60.0%)	0.163
Superficial infection	4 (8.3%)	6 (20.0%)	0.209
Deep infection	3 (6.3%)	2 (6.7%)	0.954
LD donor site seroma (requiring drainage)	12 (25.0%)	8 (26.6%)	0.878
Hematoma (requiring intervention)	1 (2.1%)	0 (0.0%)	1.000
Wound dehiscence	0 (0.0%)	0 (0.0%)	1.000
Skin necrosis	0 (0.0%)	2 (6.7%)	0.087

A total of 25 patients (32.0 %) required any kind of revision, 24 % among the immediate group and 43.3% among the delayed group without any statistically significant differences, except for fat grafting revisions, which were higher in the delayed group. Most of the immediate group patients (76 %) did not require any revisions. Most of the re-operations involved the breast implant in the reconstructed side, with only one re-reduction contralateral breast procedure in the immediate group (Table 4). Time until return to work for the active patients was not significantly different between the 2 groups (26.9 ± 18.2 versus 26.2 ± 21.7 days, $p = 0.654$).

Table 4. Re-operations (excluding the contralateral breast symmetrisation procedure in the delayed group)

	Immediate Group (n = 48)	*Delayed Group (n = 30)*	*p-value*
Breast implant revision	6 (12.5%)	5 (16.6 %)	0.741
Wound revision	1 (2.1 %)	1 (3.3 %)	1.000
Scar revision	1 (2.1 %)	1 (3.3 %)	1.000
Dog ear excision	3 (8.3 %)	2 (6.7 %)	1.000
Fat grafting	0 (0.0%)	4 (13.3%)	0.019
Re-reduction	1 (2.1 %)	0 (0.0%)	1.000
Total re-operations	12 (24.0 %)	13 (43.3 %)	0.134

Discussion/Conclusion

Performing immediate symmetrisation at the time of breast reconstruction is a reasonable and safe option in autologous LD breast reconstructions, where 76 % in our study did not require a second operation for contralateral breast symmetry. To achieve symmetry frequently requires a balancing procedure to the contralateral breast in unilateral breast reconstruction. In our study population, all the contralateral procedures were breast reductions/mastopexy without any augmentation. It has been estimated that almost half of all patients (153/336) undergoing breast reconstruction as a part of breast cancer surgery had a symmetrisation procedure performed on the opposite side [9]. There is a relative lack of literature examining treatment of the contralateral breast, particularly in a comparative way. Some authors have reported on contralateral symmetry procedures in the immediate setting, or

delayed, in conjunction with revisions to the index reconstruction or donor site and have demonstrated promising results [6-14].

The main limiting factor in autologous breast reconstruction is the volume of donor site tissue, and when as much healthy tissue as possible is transferred, the contralateral breast may need to be reduced or lifted to achieve size match. In our study, we found that the size of the breast implant was significantly smaller in the delayed group indicating that the operating surgeon did not initially schedule to perform any contralateral procedure because they probably did not find a clinically significant breast size different at the time of the reconstruction. Conversely, the initial mastectomy weight and the healthy breast reduction/mastopexy resections were significantly higher in the immediate symmetrisation group, showing that patients with large breasts are more likely to need a contralateral procedure (Table 2).

Contrary to Chang et al.'s studies [7, 11], immediate symmetry procedures did not result in twice as many revisions and complications as delayed procedures. However, in their study [11], 65 % of the patients undergoing an immediate symmetry procedure did not require any further procedures; and this rate is similar to our finding (76 %). In our study, we found that the rates of fat grafting revisions were significantly higher in the delayed symmetrisation group.

Performing a simultaneous reduction using the reconstructed breast as a model for the contralateral breast it is a very feasible way to achieve promising aesthetic results and patients' satisfaction reducing the number of further procedures. Intuitively, patients undergoing an immediate contralateral balancing procedure have fewer operations, with obvious implications on the health-care costs, use of resources, need for another general anesthesia and longer recovery.

Contrary to the common belief that the contralateral breast should not be symmetrised at the time of reconstruction as the flap should be given time to 'settle' before the surgeon attempts to match the native breast, we found a significantly higher rate (43.3 %) of revision surgery in patients undergoing delayed contralateral symmetrisation. It is possible that women who have their mastectomy, reconstruction and symmetrisation as one single operation may be more satisfied with the surgical outcome [8] and thus, are less likely to consult the surgeon again for revision surgery. Supporting this hypothesis, Yip et al. [15] showed that in the context of reconstruction and contralateral symmetrisation, breast volume symmetry was not related to satisfaction, but that satisfaction was most influenced by the pre-operative care as part of the reconstructive treatment process. Nevertheless, several authors have demonstrated better or comparable satisfaction and aesthetic outcomes with immediate symmetrisation [6, 8, 10, 13]. Due to the lack of data, we did not assess patients' satisfaction through patient reported outcomes measures.

On the other hand, a delayed approach involves more surgeries, which may damage patients' psychosocial wellbeing; affect work and life commitments; and increase clinic demand, operative time, hospital bed occupancy, the length of surgical waiting lists, and follow-up appointments.

We did not find significant differences in operative time in the immediate versus delayed group, although balancing procedure increased the duration of surgery by a mean of 20 min, and hospital stay was also similar between the study groups.

The strengths of this study include a consistent surgical technique, long-term follow-up, and very comparable groups in terms of perioperative parameters and comorbidities. Several limitations of this study should be acknowledged. This is a retrospective study and the major drawback is due to the retrospective nature and small number of participants. Moreover, the lack of randomization and decision of the individual surgeon to perform immediate or delayed contralateral symmetrisation introduce the possibility of selection bias. Nonetheless, the decision to undergo a revision is not a direct objective measure of asymmetry. Furthermore, several non-clinical factors can possibly contribute to the timing and number of revisions, including not only surgeon's preferences, but also patient's preferences, financial and working issues, and timing of adjuvant therapies.

In conclusion, restoring symmetry is an important component of breast reconstruction. A contralateral symmetry procedure is often necessary in case of unilateral breast reconstruction. Performing immediate symmetrisation at the time of breast reconstruction may lead to similar revision rate as delayed procedures, without a higher overall complication rate.

Statements

Acknowledgement

None

Statement of Ethics

This research complies with the guidelines for human studies and was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

All subjects (or their parents or guardians) have given their written informed consent, and that the study protocol was approved by the institute's Committee on Human Research. Ethical approval was not required because of the retrospective nature of this study.

Disclosure Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All authors: conception and design of the work

S. G. and S. H.: drafting the manuscript

All authors: critical review of the manuscript for important intellectual content

C. M. O., P. D. S. and I. K.: manuscript supervision

All authors: approval of the version to be published

We certify that all authors of this manuscript have participated in conceptualizing the research or content of the manuscript, in writing or critically editing the manuscript, and/or in analysis of data presented in the manuscript. Consent to submit has been received from all co-authors.

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